THE

Agricultural Journal

OF THE

CAPE OF GOOD HOPE.

312927
IARI

VOLUME XXX.

June
JANUARY ~~JULY~~, 1907.

Published by the

Department of Agriculture,

CAPE OF GOOD HOPE.

Cape Town:
CAPE TIMES LIMITED, GOVERNMENT PRINTERS.

THE AGRICULTURAL JOURNAL, VOL. XXX,

JANUARY—JUNE, 1907.

CONTENTS.

A.

Page.

Administration of Germicides ... 8
Agriculture, Miracles in ... 140
Agricultural Show Changes ... 292
Agricultural Show Dates, 105, 283, 388, 502
Agricultural Shows and Judges ... 703
Agricultural Shows, 1907, Notes on ... 373, 422, 694
Agricultural Shows, The Poultry Sections of ... 710
Agricultural Shows, Value of... 296
Albany and Bathurst, Citrus Failures in ... 42
Algerian Oats, Egyptian and ... 10
Algerian Oats, Differences in ... 250
Aloes and Ticks ... 107
American Potato Blight ... 391
American Rambouillets for South Africa ... 326
An Agricultural Credit System for Cape Colony ... 186, 817
Antestia Fruit Bug ... 302
Anthracnose in Constantia... 215
Analysis, Show Wines and ... 822
Apple Blight, Woolly Aphis or ... 830
Arsenite of Soda, Cattle Dipping in ... 595
Arsenical Dip for Goat Scab... 396, 565

B.

Banana Fibre from East Africa ... 825
Bare Fallows ... 711, 824
Bathurst, Citrus Failures in Albany and ... 42
Beefwood Borer ... 111
Biliary Fever in Dogs ... 764
Biliary Fever in a Heifer ... 106
Binde Weed ... 396
Birds of the World, the Flightless 340
Blauwtong or Malarial Catarrhal Fever in Sheep ... 249
Blight, American Potato ... 391
Blindness in Calves, Partial ... 397

Page.

Bolo, Suspected Senecio Poisoning at ... 395
Board of Horticulture, Eastern Province ... 807
Botany ... 802
Bots or "Paapjes" ... 676
Bovine Tuberculosis, Inefficacy of Dr. Behring's Serum on ... 709

C.

Calves, Dehorning of ... 554
Calves, Partial Blindness in ... 397
Cancer Bush, Tsama, Wit-Gat Tree ... 109
Cape Colony, Wheat in... 503
Cape Chemical Society, Presidential Address to ... 782
Cape Dried Fruits in Holland ... 741
Cape Wools in London ... 424
Cape Wools at the London Sales 304
Carbon Bi-Sulphide for Weevils ... 112
Care of Milk at Farms, The ... 336
Case, A Remarkable ... 744
Case of Traumatic Pneumonia, A 545
Castration, Death after ... 110
Castration of Ostriches, The ... 745
Caterpillars Destroying Trees... 358
Cattle Dipping in Arsenite of Soda 595
Changes, Agricultural Show ... 292
Cheesemaking Industry in Griqualand East ... 195
Cheddar Cheese Making ... 392
Churning, Straining before ... 153
Citrus Culture from Seed to Fruit, A Treatise on 155, 307, 437, 605, 750
Citrus Failures ... 245
Citrus Failures in Albany and Bathurst ... 42
Citrus Trees, Manuring of ... 564
Classification of Sheep at Shows, The ... 4, 294, 829
Clover, Stink ... 391
Codlin Moth, Natal Prohibits Fruit infected with ... 742

Page.
Coffee Culture, Experimental . . . 293
Collect on Delivery 423
Colonial Soils, as influenced by Geological conditions, The Fertility of some 454
Competition, Harvesting 68
Congress, The Farmers' 534, 631
Constantia, Anthracnose in .. 215
Cooling Wine, A new Device for 17
Corn Crickets, Remedial Measures 599
Cow, Suspected Tubercle in a 253
Cream Ripening Utensils . . 153
Cream Granulating in Process of Ripening 154
Credit System for Cape Colony, An Agricultural 186
Crops, The Rotation and Manuring of 496
Crossing, The Mania for . . . 294
Crystal Palace Exhibition, 1906, Prizes at the 145
Cultivators, Lucerne 591, 745
Cultivators, £100 for a 592
Cure for Sponziekte 396
Current Market Rates 124, 263, 411, 579, 726, 842
Cures for Snake Bite 826
Cyllin for Internal Administration 144

D.

Dairying Queries 152
Dairy Test at Molteno Agricultural Show, 1907 794
Death after Castration 110
Death of Veterinary Surgeon Neill, Sudden 6
Dehorning of Calves 554
Departmental Notices . . 125, 264, 412
Departmental Publications 132, 281, 413, 580, 727, 843
Delivery, Collect on 423
Destruction of Spring Hares 150
Devonshire Cream and Cream Cheese Making 434
Diarrhœa in a Horse 830
Dip for Goat Scab, Arsenical ... 396
Divining Rod, Is it a Fraud 703
Divining Rod, not a Fraud, The ... 824
Dodder and Lucerne 742
Dodder and its Eradication 775
Dogs, Biliary Fever in 764
"Domziekte" in Sheep, Sunstroke or 531
D. Hutcheon, M.R.C.V.S., the late Director of Agriculture 736
Drainage and Orchards 749
Dried Fruits in Holland, Cape ... 741
Dried Fruits, The Nicholson Sulphuring Chamber for 422
Dried Locusts for Poultry Food ... 293
Drift Sands, Molteno 558
Drift Sands and their Reclamation, Molteno 179
Dry Farming 149
Dry Wines, The New Method of Making 70

E.

Page.
Eastern Coastal Belt, The Farming Capabilities of the 91
East London Show, Wool Prizes at the . 130
Eastern Province Horticultural Board 579, 806
Economical Wagon Wheels 430, 730
Egg Laying Competition, Western Province Agricultural Society 105, 245, 389, 555, 741 850
Eggs, Skunks Eating 109
Egyptian and Algerian Oat 10
Elsenburg Agricultural College 88
Encouraging Results . 3
Experimental Coffee Culture 293
Experiments with Ostriches, 608 791
Experience, The Teaching of 830

F.

Facts of the Case, The. 149
Failures in Albany and Bathurst, Citrus 42
Failure of Peaches, etc 851
Failure of Vines, The 8, [illegible]
Fallows, Bare ... 711, 824
Farmers and Agricultural Shows. 557
Farmers' Congress 140
Farmers' Congress, The 534, 631
Farmers' Sales of Pedigree Stock 4
Farmers' Wool Presses 546, 600
Farming Capabilities of the Eastern Coastal Belt, The 91
Fencing, Jackal Proof 250, 594
Fertility of some Colonial Soils, as influenced by Geological Conditions 454
Fertilizers and Stimulants 12
Fibre from East Africa, Banana 825
Figs Casting their Fruit 300
Flightless Birds of the World 340
Flue Curing Tobacco 298
Foot Rot or "Klauw Ziekte" in Sheep 570
Fowl Sickness, Poultry Farming and 711
Friesland Cattle, Some Recent Importations of .. 671
Fruit Fly, Poisoned Bait for the 192
"Fruit Growers' Handbook," Mr. Claude Fuller's 194
Fruit, the Nicholson Sulphuring Chamber for Dried 452
Fruit for Orcharding, Proved Varieties of 11
Fruit Shipped from Cape Town to England, Return of, 372, 495, 715, 790
Fruit Trees, Netting of 292
Fruit Trees, Winter Irrigation of 748

G.

Garden, The Vegetable 750
Geological Conditions, The Fertility of some Colonial Soils as influenced by 454

Page.
Germany, Stud Stock from 173
Germicides, the Administration of 8
Gid-Sturdy, Turnsick in Sheep and Goats, Malkop or 601
Glycerining Prunes 429
Goat Scab, Arsenical Dip for, 396, 565
Goats, Half-bred Swiss 147
Goats, Swiss Milch 7, 303
Government Guano 740
Griqualand East, The Cheesemaking Industry in 195
Guano Islands, Commissioner's Report 383

H.

Half-bred Swiss Goats 147
Harvesting Competition... 68
Heartwater 741
Heifer, Biliary Fever in a 106
"Homers," Utility of, in the Country Districts 563
Horse-breeding in South Africa ... 247
Horse, Diarrhœa in a 830
Horses, Imported 152
Horse in Low Condition 393
Horses required for Purchase by the Military Authorities 800
Horse Sickness, 146, 425, 565, 714, 829
Horticultural Board, Eastern Province 549, 807
Horticultural Board, Western Province 61

I.

Imported Horses 152
Inefficacy of Dr. Behring's Serum on Bovine Tuberculosis 709
Irrigation Act, The 477
Irrigation, Railway Rebate on Fuel Oil for 2, 422
Italian Rye Grass 109

J.

Jackal Extermination 397
Jackal Proof Fencing 250, 594
Judges, The Plethora of Fixtures and 143
Judging, The Question of 296

K.

Khaki Bush, The 76
Knoopen in de Darmen, Nodular Disease in the Intestines of Sheep, or 369

L.

Page.
Lamziekte 823
Lamziekte Controversy, The 107
Lamziekte at Knysna 561
Lime for Manurial Purposes 298
Lime and Sulphur and Wool 826
Linseed Oil, Boiled and Raw 565
Locusts 12
Locust Destruction 151
Locust Invasion 300
Locusts, Paraffin for 297
Locusts for Poultry Food, Dry ... 293
London, Cape Wools in 424
London Sales, Cape Wools at the 304
Lovers of Poultry, To 292
Lucerne Cultivators 591, 745
Lucerne, Dodder and 742
Lucerne Side-delivery Rakes 429
Lucerne, Tree. Tagasaste 591
Lungsickness and its Prevention ... 603

M.

Machine Shearing 110
Maggot Fly, The 248
Malarial Catarrhal Fever in Sheep, Blauwtong 249
Malkop or Gid-Sturdy-Turnsick in Sheep and Goats 601
Mania for Crossing, The 294
Manuring of Citrus Trees 564
Manuring of Crops, The Rotation and 496
Manuring of Oathay at Elsenburg Agricultural College 698
Manurial Purposes, Lime for 298
Manures and Mealies... 12
Manure, Sawdust as 748
Mares, Seeds and Fruits, Practical Guide for the Distillation of... 79
Market, The Produce
135, 285, 415, 583, 729, 845
Market Rates, Current
124, 263, 411, 579, 726, 842
Mayer on Wine Making, Mr. C. ... 9
Meat, Prices of 226
Mealies, Preserved Green 249
Merino, Wanted—a South African 5
Methods of Milking 705
Milch Goats, Swiss 7, 303
Milk at Farms, The care of 336
Milk, The Quality of 354
Milking, Methods of 705
Millions of Swallows and Spreuws 397
Miracles in Agriculture 140
Mohair Question, A—Mixed Kids 304
Mohair and Ostrich Feather Association, National Wool... 199, 813
Molteno Agricultural Show, Report of Dairy Test 794
Molteno Drift Sands 558
Molteno Drift Sands and their Reclamation 179
Museum, Port Elizabeth 296

N.

Page.

Natal Prohibits Fruit Infected with Codlin Moth . .. 742
National Wool, Mohair, and Ostrich Feather Association 199, 815
Neill, Sudden Death of Veterinary Surgeon 6
Netting of Fruit Trees . . 292
New Device for Cooling Wine 17
New Methods of Making Dry Wines 70
Nicholson Sulphuring Chamber for Dried Fruit 432
Nodular Disease of the Intestines of Sheep, or Knoopen in de Darmen 369
Notices, Departmental .. 125, 264, 412
Notes on the Weather 116, 255, 403, 571, 718, 855

O.

Oats, Algerian 250
Oats, Egyptian and Algerian 10
Oathay at Elsenburg Agricultural College, Manuring of 698
Oil used as Fuel for Irrigation Purposes, Rebate on 422
Orchards, Drainage and 749
Orcharding, Proved Varieties of Fruit for 11
Orchard Competition at Paarl ... 147
Order, A Tall 297
Ostrich Chicks, Yellow Liver in 14, 292, 332, 564
Ostriches, Experiments with... 698, 791
Ostrich Feather Association, National Wool, Mohair... 199, 813
Ostriches, The Castration of 745
Ostrich, The Southern 823
Oversea Plant Import Regulations 232

P.

"Paapjes," Bots or 676
Paarl, Orchard Competition at ... 147
Pampas Grass to Prevent Sluits ... 712
Paraffin for Locusts 297
Partial Blindness in Calves 397
Paspalum at Paarl under Irrigation 148
Paspalum, Very like 246
Peaches, Failure of 831
Pedigree Stock, Farmers' Sales of 4
Peronospera, Vine Mildew, or 330
Plant Import Regulations, Oversea 232
Plant Import Regulations, South African Inter-Colonial 237
Plethora of Fixtures and Judging, The 143
Plum-Apricot, A 10
Pneumonia, A case of Traumatic 545
Poisoned Bait for the Fruit Fly ... 192
Poisoning at Bolo, Suspected Senecio 395
Port Elizabeth Museum 296

Page.

Potato Blight, American [illegible]
Potatoes, Scab in [illegible]
Poultry Farming, and [illegible] ness . [illegible]
Poultry Food, Dry Locusts for [illegible]
Poultry for Profit The Virtues of the Wyandotte [illegible]
Poultry Sections of Agricultural Shows, The [illegible]
Poultry, To Lovers of [illegible]
Practical Guide for the Distillation of Wines, Marcs, Lees, and Fruits . [illegible]
Preparing Skins for Market [illegible]
Preserved Green Mealies [illegible]
Presses, Farmers' Wool [illegible]
Prices of Meat .. [illegible]
Prizes at the Crystal Palace Exhibition, 1906 [illegible]
Produce Market, 135, 285, 415, 565, 721, 815
Propagation of Paspalum, The 112
Proved Varieties of Fruit for Orcharding 11
Prunes, Glycerining [illegible]
Prune Growers' Association, South African .. 140
Publications, Departmental, 132, 281, 415, 580, 727, 845

Q.

Quality of Milk, The .. [illegible]
Question of Judging, The [illegible]

R.

Railway Rebate on Fuel Oil for Irrigation 2
Rainfall, 121, 260, 408, 576, 725, 839
Rainfall Records 562
Rakes, Lucerne Side delivery 429
Rambouillets for South Africa, American . .. 526
Ramie for South Africa . 580
Rebate on Oil used as Fuel for Irrigation Purposes 422
Regulations, Oversea Plant Import 232
Regulations, South African Inter-Colonial Plant Import ... 237
Report of the Dairy Test at Molteno Agricultural Show 794
Remarkable Case, A 744
Remarkable Storm, A 16
Return of Fruit Shipped from Cape Town to England, 372, 495, 715, 790
Rhodesian Farmers' Handbook 597
Rietti Wheat... 590
Root Rot, Woolly Aphis and . 598
Rotation and Manuring of Crops ... 496
Rural Cape Colony 50, 361, 522
Rural Reports, 114, 253, 398, 568, 716, 832
Rye Grass, Italian 109

S.

Page.

Sales of Pedigree Stock, Farmers' 4
"Samson" Windmill, The .. 113, 305
Sawdust as Manure ... 748
Scab, Arsenical Dip for Goats, 396, 565
Scab, Its Cause, Nature, and Treatment ... 707
Scab in Potatoes ... 397
Sckuhria bonariensis—Troublesome Weed ... 246
Scrub Exterminator ... 598
Seeds for Trial ... 299
Shearing, Machine ... 110
Sheep, Blauwtong or Malarial Catarrhal Fever in ... 249
Sheep, Nodular Disease of the Intestines of, or Knoopen in de Darmen ... 369
Sheep at Maraisburg, Unknown Disease among ... 392
Sheep at Shows, the Classification of ... 4, 294, 829
Sheep, Wireworm in ... 593
Shows, the Agricultural ... 373, 694
Show Changes, Agricultural ... 292
Show Dates, Agricultural, 105, 283, 388, 502
Show Dates Changed ... 2
Shows and Judges, Agricultural . 709
Show Season, The ... 142
Shows, Value of ... 296
Show, The Wine ... 101
Show Wines and Analysis ... 822
Shows, Wine, 1907 ... 422
Side-delivery Rakes, Lucerne ... 429
Skins for Market, Preparing ... 705
Skunks eating Eggs ... 109
Snake-bite, Cures for ... 826
Soga, the late J. F., M.R.C.V.S. ... 6
Soils, as influenced by Geological Conditions, The fertility of some Colonial ... 454
South African Inter-Colonial Plant Import Regulations ... 237
South African Meat in London ... 428
South African Merino, Wanted a 5
South African Prune Growers' Association ... 140
South African Stud-Book ... 2, 220
South African Wools ... 205
Southern Ostrich, The ... 823
Sponziekte, Cure for ... 396
Spring Hares, The destruction of 150
Stellenbosch Winery ... 594
Stimulants, Fertilisers and ... 12
Stink Clover ... 391
Storm, A Remarkable ... 16
Straining before Churning ... 153
Stud-book from Germany ... 173
Sudden Death of Veterinary-Surgeon Neill ... 6
Sulphuring Chamber for Dried Fruit, Nicholson ... 432
Sulphur Compounds for Scab ... 12
Sunstroke or "Domziekte" in Sheep ... 531
Suspected Senecio Poisoning at Bolo ... 395
Suspected Tubercle in a Cow ... 252

Page.

Swallows and Spreuws, Millions of 397
Swiss Goats, Half-bred ... 147
Swiss Milch Goats ... 7, 303

T.

Tagasaste, or Tree Lucerne ... 591
Tall Order, A ... 297
Teachings of Experience, The ... 830
Ticks, Aloes and ... 107
Ticks, the Vitality of ... 393
Tobacco, Flue Curing ... 299
Tobacco at Kuils River ... 15
Tobacco Wilt in the Kat River Valley ... 691
Traumatic Pneumonia, A Case of 545
Trees, Caterpillars destroying ... 358
Trees, Netting of ... 292
Treatise on Citrus Culture from Seed to Fruit, 155, 307, 437, 605, 701
Trial, Seeds for ... 299
Troublesome Weeds ... 113
Troublesome Weed—*Sckuhria bonariensis* ... 246
Tsama, Wit-Gat Tree, Cancer Bush 109
Tubercle in a Cow, Suspected ... 252

U.

Unknown Disease among Sheep at Maraisburg ... 392
Utility of "Homers" in the Country Districts ... 563

V.

Value of Agricultural Shows ... 296
Vegetable Garden, The ... 750
Very Like Paspalum ... 246
Veterinary Medicines, Weights and Measures for ... 250
Vine Cuttings, 1907: American ... 306
Vines, The Failure of ... 8, 95
Vine Mildew, or Peronospera ... 330
Vitality of Ticks ... 393

W.

Wagon Wheels, Economical ... 430
Wanted: A South African Merino 5
Water Drills and Water Boring, 559, 714, 827, 828
Weather, Notes on the, 117, 255, 403, 571, 718, 835
Weeds, Troublesome ... 113, 246
Weevils, Carbon Bi-Sulphide for ... 112
Weights and Measures for Veterinary Medicines ... 250
Western Province Agricultural Society's Egg Laying Competition, 103, 243, 389, 555, 741, 820
Western Province Horticultural Board ... 61
Wheat in Cape Colony ... 503

Page.
Wheat, Rietti ... 590
Wilt in the Kat River Valley, Tobacco ... 691
Wine, A New Device for Cooling 17
Wine Making, Mr. Mayer on ... 9
Wines, Marcs, Lees, and Fruits, Practical Guide for the Distillation of ... 79
Wines, The New Method of Making Dry ... 70
Wine Show, The ... 101
Wine Show, 1907 ... 423
Windmill Competition, A ... 305
Windmill, The "Samson" ... 113, 305
Winter Irrigation of Fruit Trees ... 748
Wire Worm in Sheep ... 593
Wit-Gat Tree: Cancer Bush, Tsama ... 109
Woolly Aphis or Apple Blight ... 830
Woolly Aphis and Root Rot ... 598
Wool at the London Sales, Cape ... 304
Wools in London, Cape ... 424
Wool, Mohair, and Ostrich Feather Association, National ... 199, 813
Wool Presses, Farmers' ... 546, 600
Wool Prizes at the East London Show ... 140
Wools, South African ... 205
Wool Trade of the Cape, The ... 684
Wyandotte: Poultry for Profit, The Virtues of the ... 345

Y.

Yellow Liver in Ostrich Chicks, 14, 292, 332, 554

LIST OF ILLUSTRATIONS IN THE TEXT.

Temporary Wine Cooler fitted up for experiments, University Air-Blast Wine Cooler ... 19
Scheme of Cooling Machine ... 27
Interior, Wellington Co-operative tive Winery ... 51
Part of Cellar, Wellington Co-operative Winery ... 52
Fermenting House, Wellington Co-operative Winery ... 55
The Homestead of Mr. L. Abrahamson, M.L.A., at Wellington ... 56
Exterior, Wellington Co-operative Creamery ... 56
Engine Room, Wellington Co-operative Creamery ... 57
Interior View, Wellington Co-operative Creamery ... 58
Interior Wellington Co-operative Creamery ... 59
Snap-shots at the Harvesting Competition ... 69
The Khaki Bush ... 77
Paspalum at Paarl under Irrigation ... 148
East Frisian Red and White Cow, "Luise 7,599" ... 173
East Frisian Black and White Bull "Primus" ... 173
East Frisian Black and White Cow "Siegerin" ... 174
East Frisian Black and White Heifer, "Fanni" ... 174
Oldenburg Stallion, "Champion II." ... 177
Three Year Old Oldenburg Filly, "Minoka 11,441" ... 177
Rambouillet Ram, Robust woolled, bred in Saxony ... 178
Rambouillet Ram, Fine woolled, Bred in Saxony ... 178
The Excelsior Gobet Knapsack Sprayer ... 217
The Antestia Fruit Bug ... 302
Dr. Smartt's American Rambouillets, The two year old Ram ... 327
Dr. Smartt's American Rambouillets, A full grown Ewe ... 327
Dr. Smartt's American Rambouillets, A full-grown Ewe ... 328
Dr. Smartt's American Rambouillets, Group of young Ewes ... 328
Dr. Smartt's American Rambouillets, A ten months' old Ram ... 329
The Gamtoos River at the Railway Bridge ... 363
The Hankey Irrigation Tunnel, showing Stream of Water ... 364
The Hankey Tunnel from the front 367
Mr. Ruperti's Thoroughbred "Damocles," the Rosebank Champion ... 373
Mr. A. G. H. Kotze's Flemish Stallion, "Thomas," 1st at Rosebank ... 373
Mr. H. Kennedy's Rosebank Champion S.A. Bred Bull (heavy type) ... 373
Mr. E. H. Mellish's Rosebank Champion, S.A. Bred Cow (Heavy Type) ... 374
Mr. Rawbone's Rosebank Champion Ayrshire Cow ... 377
"Katie," another distinguished Ayrshire Cow of Mr. Rawbone's ... 377
"Moore," 1st and Champion Robust Woolled Ram, at Rosebank and Aliwal North ... 378
Fine Woolled Champion Ram, at Rosebank ... 378
Fine-Woolled Champion Ewe at Rosebank ... 381
Champion Robust-Woolled Ewe at Rosebank ... 381
A Karoo Veld-reared Prize Winner 382
Group of Veld-reared Rams from Britstown ... 382
Lucerne Side-delivery Rake ... 429
Nicholson Sulphuring Chamber for Dried Fruit ... 433
The Homestead, "Rustenberg" ... 523

Page.
Fruit Packing for Export at Rustenberg 524
The Homestead, "Schoongezicht" 525
A Handy Fruit-box Carrier for the Orchard 526
The Wine Cellar, "Schoongezicht" 527
Packing Fruit for Export, "Schoongezicht" 527
Stellenbosch Co-operative Winery 528
Fermenting House, Stellenbosch Co-operative Winery 528
The "Dop" Press 530
Farmers' Wool Presses 547
Lucerne "Sandow" Cultivator ... 592
Wool Press, made by Messrs. Cunningham and Gearing 600
Pamplemous Stock: Washington Navel 613
Washington Navel: Second Union grafted on to Pamplemous Stock 613
Cinnamon Orange on Seville stock 613
Cinnamon Oranges 613
Seville Stock and Cinnamon Orange 613
Washington Navel 613
A Block of Washington Navel Oranges 613
Ostrich Feathers 668
The 1907 Champion Angora Ram 684
Back View of Same 684

Page.
First Prize 6-tooth Angora Ram, at Port Elizabeth 695
Mr. M. Gadd's Grey Arab Stallion "Saharoni" 695
Hackney Stallion, "Royal Standard" 696
Thoroughbred Stallion, "Victor "Don" 696
Third Union Grafting: Four-year-old Orange Graft on Lemon Stock, ten feet high 762
Cinnamon Orange: Second Union to Lemon crossed from Seville 762
Third Union Grafting: Naartje on Lemon Stock 762
Cinnamon Orange: Second Union to Lemon from Seedling 762
Grafting for shape, using the topmost twig for grafting 762
First Union Bud to Lemon: Washington Navel Orange, showing its early bearing defects ... 763
Orange on Lemon Stock 763
Dodder (Cuscuta Epithymum, Murr.) on Lucerne 777
Dodder (Cuscuta appendiculata): Half natural size 778
Microscopic section of haustorium of Dodder 779
Lucerne and Dodder Seed 780
Juvenal Feathers, or First after Chicks 792
Spadonas 793

THE

Agricultural Journal

OF THE CAPE OF GOOD HOPE.

No. 1. JANUARY, 1907. VOL. XXX.

Published Monthly in English and Dutch by the Department of Agriculture and distributed gratis to bona fide farmers in the Cape Colony on application through the Resident Magistrate of the District.

Advertising.—Approved Advertisements are inserted. Full particulars can be obtained of Messrs. Hart & Co., the Advertising Agents, Parker's Buildings, Cape Town, to whom all communications *re* advertising should be addressed.

Postal Address:

The Editor "Agricultural Journal," Department of Agriculture, Capetown.

Telegraphic Address: "Bulletin," Capetown.

CONTENTS.

PAGE.

NOTES— 2—9

Railway Rebate on Fuel Oil for Irrigation.—Show Dates Changed.—The Dairy Expert.—The South African Stud Book.—The Revised Free List.—Encouraging Results.—Farmers' Sales of Pedigree Stock.—The Classification of Sheep at Shows.—Wanted: A South African Merino.—Sudden Death of Vet. Surg. Neill.—The Late J. F. Soga, M.R.C.V.S.—Swiss Milch Goats.—The Administration of Germicides.—The Failure of Vines.—Mr. Mayer on Wine Making.—To Advertisers.

FARM AND VELD— 10—16

A Plum-Apricot.—Egyptian and Algerian Oats.—Proved Varieties of Fruit for Orcharding.—Locusts.—Fertilizers and Stimulants.—Manures for Mealies.—Sulphur Compounds for Scab.—Yellow Liver in Ostrich Chicks.—Tobacco at Kuils River.—A Remarkable Storm.

A NEW DEVICE FOR COOLING WINE. By Frederick T. Bioletti. (*Illustrated*) ... 17—41
CITRUS FAILURES IN ALBANY AND BATHURST ... 42—49
RURAL CAPE COLONY, No. XXIII.—CO-OPERATION AT WELLINGTON. (*Illustrated*). By F. D. MacDermott ... 50—60
WESTERN PROVINCE HORTICULTURAL BOARD ... 61—67
HARVESTING COMPETITION. (*Illustrated*) ... 68—69
THE NEW METHODS OF MAKING DRY WINES. By C. Mayer, late Viticultural Assistant. 70—75
THE KHAKI BUSH. (*Illustrated*) ... 76—78
PRACTICAL GUIDE FOR THE DISTILLATION OF WINES, MARCS, LEES AND FRUITS ... 79—87
ELSENBURG AGRICULTURAL COLLEGE ... 88—91
THE FARMING CAPABILITIES OF THE EASTERN COASTAL BELT ... 91—94
THE FAILURE OF VINES ... 95—100
THE WINE SHOW ... 101—102
WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION ... 103—104
AGRICULTURAL SHOW DATES ... 105
CORRESPONDENCE 106—113

Biliary Fever in a Heifer.—Aloes and Ticks.—The Lamziekte Controversy.—Cancer Bush, Tsama, Wit-Gat Tree.—Italian Rye Grass.—Skunks Eating Eggs.—Machine Shearing.—Death after Castration.—Beefwood Borer.—Carbon Bi-Sulphide for Weevils.—The Propagation of Paspalum.—The "Samson" Windmill.—Troublesome Weeds.

RURAL REPORTS ... 114—116
NOTES ON THE WEATHER OF NOVEMBER, 1906 ... 117—120
RAINFALL RETURNS, NOVEMBER, 1906 ... 121—123
CURRENT MARKET RATES ... 124
DEPARTMENTAL NOTICES ... 125—131
DEPARTMENTAL PUBLICATIONS ... 132—135
THE PRODUCE MARKET ... 135—136
BREEDERS' DIRECTORY ... 137—138
INDEX TO ADVERTISERS ... lxxiii—lxxiv

3

NOTES.

Railway Rebate on Fuel Oil for Irrigation.

The attention of all interested in the use of oil as fuel for engines employed in irrigation work is specially directed to the Departmental Notice on the subject of Railway Rebates on that commodity, which appears in this issue. From this it will be seen that in addition to the rebates now given, the Commissioner has decided to allow a further rebate of one-half of the third class rates on production of a certificate that the oil has been consumed for irrigation purposes. As a first step a list of irrigators using oil engines is to be compiled and persons desirous of appearing on this list must apply through the C.C. of their district. Full details, with forms of certificates, are published and the offer should meet with a good response.

Show Dates Changed.

Attention is directed to the complete list of show dates in the current issue. Several new fixtures have been added, and two important alterations of dates made. The first of the latter is that of Caledon, which has been altered from Thursday, February 14th, to Thursday, February 28th. The second is that of Queenstown, which has been fixed for Wednesday, Thursday and Friday, February 13th, 14th and 15th, instead of February 20th 21st and 22nd. The Queenstown date was changed in order to avoid overlapping the Western Province Show. But in making the change, the Queenstown Society has encroached on the dates fixed for the Aliwal North Show.

The Dairy Expert.

The Government Dairy Expert, Mr. R. Silva Jones, wishes it to be known that his permanent official address is Berry Street, Queenstown, and all official communications should be addressed to him there. At present letters frequently follow him all over the country, and often reach him too late for the replies to be of much use. Correspondents and those desirous of communicating with Mr. Jones should note in future that by addressing him at Queenstown they are more likely to get into direct touch with him than by attempting to follow him on his lecturing rounds.

The South African Stud Book.

We have to acknowledge receipt of the first volume of the *South African Stud Book*, a work that reflects great credit upon all concerned in its production. It is a well-got-up book of some three hundred pages, and gives a fair record of thoroughbred stock in the country. It is to be regretted that Natal and Rhodesia are not as yet included, as there must be a good deal of stock in those two Colonies that could be registered. The Stud Book should grow into an important and valuable aid to the stock farmers of South Africa, particularly when the foundation herds and flocks entered in the auxiliary stud books of the various States are brought through their probationary periods. The ostriches alone should swell the work tremendously.

The Revised Free List.

Attention is again directed to the revision of the Free List of the *Agricultural Journal,* made in accordance with instructions. The new list comes into force with this issue. From the beginning of this year the free list is to be confined to *bona fide* farmers and agriculturists, upon application through the Resident Magistrate of the district. To meet the demand of non-farming members of Agricultural Societies and Farmers' Associations a certain number of copies will be forwarded each month to the secretaries for circulation among them. The circulation of both the English and Dutch editions has been much widened (the latter having more than doubled), and it is now hoped to be able to convey to the great bulk of the farming population the whole of the information disseminated by the Department from time to time. By the old system, a large number of farmers and agriculturists were left unsupplied.

Encouraging Results.

Messrs. Eaton, Robins and Co., of St. George's Street, Cape Town, forward a copy of Messrs. Chas. Balme and Co.'s report on the December London wool sales, in which they say of a clip forwarded by that firm: "A few lots of new clip greasy wools from the Western Province, which had been specially classed and skirted in accordance with advice given by the Government experts, were offered during the series. These clips, which were in exceptionally light condition, attracted unusually keen competition, and sold at prices ranging from 1s. to 1s. 1½d. per lb., figures which fully demonstrate the advantages accruing to growers from efficiently classing and skirting their wools. It is to be hoped that flock owners in other parts of the South African Colonies who have not hitherto troubled themselves to class and skirt, will also be induced by the Government officials to take greater pains in preparing their wools for market, and that, if nothing else is attempted, they will at least remove dung lumps and heavy skirts from the fleece before they are packed."

Farmers' Sales of Pedigree Stock.

The Hon. C. W. H. Kohler, M.L.C., gave notice at the last meeting of the Paarl Farmers' Association to move the following resolution at the January meeting: "With a view to having a stock fair, where sound and pedigree stock shall be submitted for sale, this meeting authorises the secretary to enter into correspondence with the various associations throughout the Western Province, asking them to co-operate in the holding of such a show once a year at Klapmuts." This movement is worthy of support, and if adopted, the trial will be watched with keen interest. There is no reason why the west cannot emulate the east, where ram fairs are now a recognised and flourishing institution.

The Classification of Sheep at Shows.

The Hon. W. H. Rogers, M.L.C., writes: "In the *Agricultural Journal* of October, 1906, I note your remarks on a letter of mine on the classification of Merino sheep at agricultural shows. From these remarks, I infer that you do not favour the reform suggested by me. First, because it is impracticable. Second, because breeds are only types of the same family; and lastly, because Merino sheep are kept first and last for the wool they produce. I would very much like you to point out where the impracticability of the suggested scheme of reform comes in. I notice, in the prize list just issued by the Aliwal North Agricultural Society, that body has made short work of the impractical side of the question, as they have adopted in its entirety the reform suggested by me. Now for the second portion of the argument, 'that breeds are only types of the same family.' True, but they vary vastly in the power of retaining their special characteristics for which they are noted when brought to graze on unsuitable pastures and in an uncongenial climate. It is, therefore, absolutely necessary in the interest of the sheep breeding and wool growing industry of the country, that breeds of stud sheep should be built up and recognized at agricultural shows, which are found best suited to the requirements of the country. This will never be done as long as the present fruitless classification of Merino sheep at shows is persisted in. The system has been continued too long with no good results, and it is time that it was abolished. It is apparent to everybody the great strides cattle breeding has made in this country during the past twelve years. Mongrel breeding has become a thing of the past. You can now get an animal with a pedigree, possessing sterling and special points. If the same judicious system had been practiced by sheep breeders in the Colony, and if Agricultural Societies had supported them in establishing a system of competition for 'breeds,' this Colony would to-day have been exporting some of the choicest animals in the sheep line that were ever produced in the world, instead of being a dumping ground for culls and nondescripts to the detriment of our flocks and prestige of the industry.

"Now for the last point, 'Merino sheep are kept first and last for the wool they produce.' This cannot be accepted as a general principle. In the Australian Colonies it may be so. In the Argentine it is not so. In the European countries it is not so. In South Africa—well, we could do with a little more mutton along with the wool. Manufacturers who buy wool look for regularity and uniformity in clips they purchase. Nondescript animals without pedigree, although displaying a fine fleece at a show or a good, robust fleece, are never certain of the impress on their descendants. It is the great want of pedigree sheep in the Colony, or breeds of a fixed type, that has largely brought about the irregularity and unevenness in our Cape wools. This great want of uniformity in our wools was brought prominently to my notice by a large wool buyer in an up-country town lately. The wool season was 'on.' The wool buyer shewed me eight or nine different samples of wool out of lots he had purchased, and to my amazement there were not two samples alike. I said: 'Surely these are not your district wools?' He said that he bought them for such. Fifteen years ago that district held a good reputation for its wools, but from that time it had gradually gone back. I wondered what the manufacturer would do if he bought such an uneven lot of stuff? Agricultural Societies could do a great deal of good towards remedying this backward condition of things if they used their influence in granting awards for the building up of breeds of Merino sheep most suitable for the country, and discourage the useless competition of robust and fine wool, a most primitive and non-progressive competition."

Wanted—A South African Merino.

Mr. Rogers's further contribution to the interesting question he raised originally is welcome, and we trust it may lead to the publication of more opinions. Incidentally, Mr. Rogers seems to desire to controvert our remarks offered on his first letter, thinking the reforms he suggests are not received with favour. To make our position clearer, we may explain that we fear the lines laid down in his first proposal would be found impracticable because it would mean so much subdivision of the classes. Beside that it has yet to be shewn in South Africa that Merinos, kept purely to either of the four types named, are best suited to our conditions. Besides that confining competition to the types represented by the terms Vermont, Rambouillet, Tasmanian and Australian, would be something of a conundrum for many sheepmen in this Colony.

We quite believe reform in classification to be urgently required, but cannot see how the method advocated by Mr. Rogers is going to help the sheep industry of the country forward. It would probably be a good thing for a few stud breeders—but would not help the bulk of our sheep farmers. The real keynote of true reform is struck in the last sentence of Mr. Rogers's communication in this issue, where he says: "Agricultural Societies could do a great deal of good towards remedying this backward condition of things if they used their influence in granting awards for the building up of breeds of Merino sheep *most suitable for the country*." Such a desirable consummation can never be reached by confining competition to types or breeds of animals specially built up to meet the requirements of *other* countries. What we should aim at is to develop types that suit the conditions of this country, and use those of other countries to suit our own ends. A South African Merino of a distinct type suited to our conditions should be worth more to South Africa than types developed for other countries and different conditions; and the production of such an animal can never be encouraged by confining competition to the breeds of other lands within narrow limits.

Sudden Death of Vet. Surg. Neill.

The *Bechuanaland News* reports the painfully sudden death of Mr. J. Neill, M.R.C.V.S., the Government Veterinary Surgeon of those districts. Deceased was on a visit to Mr. Cullinan's farm, "England," some distance out of Vryburg, when he was taken ill. It was considered advisable to bring him to town to consult a doctor, and on the way he died of heart failure while resting alongside the road under the shade of a bush. The body was brought in to the Vryburg Hospital, and from here the last sad rites were performed, most of the leading residents of the town following the remains to the grave. The death took place on Wednesday, December 12, and the funeral on Friday, December 14. The post mortem shewed that deceased had had valvular disease and dilatation of the heart, and that the immediate cause of death was syncope. Mr. Neill had contracted malarial fever in a very severe form at Komati Poort a few years ago which might have laid the foundation for the condition that caused his death. He was born at Kilmarnock, Scotland, in 1873, and came to this country during the war as veterinary officer attached to a column, and saw some hard work, as he held a medal with five clasps. He was much attached to his profession, and has done more (states the *News*) to gain the confidence of the Boers, both English and Dutch, in the "Veearts" than anyone else. He was also very good hearted, and many a "broken-down" could tell of his ready response to the appeal for assistance.

The Late J. F. Soga M.R.C.V.S.

The native paper *Izwi Labantu*, of December 11, has the following reference to the late J. F. Soga, M.R.C.V.S.:—His friends will hear with regret of the death of Mr. Jotello Festire Soga at Amalinda, East

London. The fourth son of the late Rev. Tiyo Soga, he was a well known figure in the Cape Colony, and was widely esteemed by white and black alike, and especially by the European farming classes, who admired his work as a veterinary surgeon and ever spoke generously of his qualifications and gifts in that line of practice. Graduating at the Dick Royal College of Veterinary Surgeons, Edinburgh, of which he held a diploma, and which is famed throughout the world for its training he entered the service of the Colonial Government along with the present Chief Veterinary Surgeon Borthwick, standing next to him on the civil list in the Colonial Veterinary Department then under that excellent man the present Director of Agriculture, Mr. D. Hutcheon. For fifteen years he served the Government, first as lecturer on diseases of stock and their treatment in Somerset East, and elsewhere, and after that in practical work of the Veterinary Department in almost every part of the Cape Colony and Bechuanaland. For special services in British Bechuanaland during the rinderpest outbreak he was specially thanked by the High Commissioner, Lord Milner. The deceased had a singular knack of getting on with all classes, and before his retirement from the service a few years ago was able, not only to outlive all opposition, but was considered to be one of the best exponents of practical veterinary work in the Cape Colony. The rough life, and unsettling habits connected with the work severely tried his health, and the constant travelling, shifting from place to place, undermined his constitution, and forced him to retire prematurely from a cause to which he had devoted his best energies, and in which he had won the confidence and esteem of thousands throughout the country. He was allowed a pension by the Government, which he has not lived long to enjoy, as he died at the comparatively early age of 41 years. A gold medallist in botany, his investigations into the medicinal properties of South African plant life were extensive, and he is mentioned in Professor Andrew Smith's South African Materia Medica (Lovedale). His death took place on the 6th inst. at Mr. A. P. Fitchett's farm, Amalinda, and his funeral was attended by whites and blacks alike, who co-operated in the last sad offices to their departed countryman.

Swiss Milch Goats.

Particulars are now to hand in response to the enquiries set afoot by the Agricultural Department as to the probable cost of Swiss milch goats landed in this Colony. The Agent General advises the freight rates on goats from Hamburg or Antwerp to Cape Town would be on shipments from one to five animals £5 per head, of six and over £4 10s. per head. A reduction of five shillings per head off the tariff rates for six goats may be allowed on shipments of 20 goats and over. The steamer providing boxes or pens, food and water.

The British Representative at Berne (Sir G. Bonham) forwards, through the Foreign Office, the following details supplied to him by the Swiss Federal Department of Agriculture: Good specimens of the Saanen breed of goats of from one and a half to three years are worth approximately 80 fr. (£3 2s.) The cost of the journey from Berne to Hamburg is 26 frs. (£1 0s. 10d.) per 100 kilos, if sent by *grande vitesse*, the animal travelling separately enclosed in a crate; 615 frs. (£24 12s.) if sent by truck load containing from 25 to 30 goats *grande vitesse* omnibus trains; 435 frs. (£17 8s.) by truck load *petite vitesse* goods trains. The additional expenses would be an attendant, approximately, 10 frs. (8s.) per day. Forage uncertain. Litter 45 centimes (4½d.) per head. Veterinary certificate about 50 centimes (5d.) per head. Customs dues and charges uncertain. Insurance about 5 per cent.

A later communication received from Berne through the Foreign Office gives the following information received from the Swiss Department of Agriculture with reference to goats of the Toggenburg breed: Good specimens of these goats, which have arrived at the age of reproduction, cost: Females, a minimum price of 75 frs. (£3): males, 100 frs. (£4). According to information supplied to the Department of Agriculture by the firm of Danzas and Co., at St. Gall, the cost of transport to Hamburg would be 25 frs. (£1) per goat, if 25 goats were sent together. The Department of Agriculture further state that autumn or early winter, or in case of necessity summer, are the best seasons for the purchase of goats. Spring is most unsuitable, as the females would not be able to stand the journey owing to their having just kidded, or being about to kid.

The Administration of Germicides.

Among the correspondence which has transpired on the lamziekte question, one writer asked the Director of Agriculture whether he did not think that in some of these cases, possibly due to pasteurella infection, carbolic acid might be injected as a germicide. He had been dosing with Stockholm tar, 3 ozs., with carbolic acid added. To this Mr. Hutcheon replied: "I wish to point out that these pasteurella organisms enter the system through the digestive canal, and are absorbed from the mucous membrane lining of the stomach and bowels. I consider it much better, therefore, to give the germicide through the same channels. The dose of tar can be increased and repeated with advantage. It is safer and better than almost any other germicide for cleaning out the digestive organs."

The Failure of Vines.

The discussion of the Anaheim disease of vines of California, which is published in the current issue, should prove of interest to the viticulturists of the Cape. It will be noted that M. Ravaz, the authority discussed, lays stress upon the drain which over-bearing puts upon the plant. It is as well to mark the details of this discussion well, for with the well-known tendency to prolific bearing in Cape vineyards it may help to fathom some problems which would otherwise be inexplicable. It will be noted that Mr. Bioletti suggests that while overbearing may be the main or determining cause of the Anaheim disease, it may not be the only and sufficient cause. At any rate the theory, as worked out by M. Ravaz, is useful, and may help vignerons to a better understanding of some of the mysterious mishaps which occur in their vineyards.

Mr. Mayer on Wine Making.

In connection with the article by Mr. C. Mayer on Wine Making, published in this issue, that gentleman writes privately stating that he will be pleased to assist farmers in purchasing the materials he recommends for use if they will forward their orders to him. They would have to be purchased in quantities of not less than 100 kg.—equalling 230 lbs. English—the prices, f.o.b., European ports being as under:—Tartaric acid, per 100 kg., 220 to 225 marks (say, £11 to £11 5s.); tannic acid, per 100 kg., 350 to 400 marks (say, £17 10s. to £20): and metabisulphite, per 100 kg., 100 marks (say, £5). The order should be accompanied by a remittance. Mr. Mayer writes from Coblenz, 12, Markenbildsherney.

To Advertisers.

Will advertisers please note that Messrs. Hart and Co., of Parker's Buildings, Burg Street, Cape Town, have been appointed sole agents for the advertising in *Agricultural Journal*. All communications referring to advertising should be addressed to that firm in the future.

Messrs. Hayward, Young and Co., of Port Elizabeth, offer to send to any farmer one of their almanacks for 1907 on application direct to them, in Dutch or English.

FARM AND VELD.

A Plum-Apricot.

Mr. J. P. Cillie, of the Slang River Nurseries, Wellington, writes: I am forwarding you a box containing some fruit, which I succeeded in raising myself. Some few years ago I crossed the apricot on the plum ("Cape cherry plum"), and succeeded in establishing a fruit which, while being a plum, retains much of the appearance and taste, to some extent, of the apricot. The original tree, obtained through cross-fertilization, proved an exceedingly good grower and no shy bearer. But all subsequent trees obtained by budding and grafting proved so unprolific that I gave up all further propagation of this particular cross, simply retaining the one tree originally raised, until I discovered lately that I was propagating on unsuitable stocks.

The fruit forwarded fully answers to the above description, and should meet with a ready demand if produced in quantities. The flavour is a quaint modification of the apricot. The difficulty before the grower would be to convince consumers that this product has some special virtue to recommend it.

Egyptian and Algerian Oats.

A correspondent asks for an explanation as to the difference between Egyptian and Algerian oats. This is a matter which often causes perplexity. It is best explained by going back to the year 1898, when the Cape oat suddenly succumbed to the rust fungus everywhere except in the inland parts of the Colony. The outbreak was sudden and unexpected, but in a couple of seasons the old favourite variety vanished, and all attempts to reintroduce it in the coastal districts have since proved disastrous. Oathay was at that time much in demand. Seed was imported from various sources with varying results. The Government instituted an enquiry into the origin of the oats which had given satisfaction. Three sources were found. The oats were in each case of the same type characterised by a thick husk larger than the grain, which is itself much less conspicuous than in the thin skinned, plump grained oats of Europe, whether Side, Scotch, Banner or Tartarian. This type is generally classed as Algerian, although the seed did not come from North Africa as some unscrupulous firms averred, but from Australia and America.

For some incomprehensible reason, Australian seed, mostly from New South Wales, Tasmania and Victoria, came to be known, especially in the Eastern Province, as "Egyptian," an altogether misleading title. But seed of Australian origin was also called Algerian, as was the seed imported from Buenos Ayres, although at one time this was specially designated River Plate oat.

Finally, a very good rust-resistant oathay was grown from seed, called Texas, and coming from that country, though supposed to have originated in Mexico. This variety, although scarce, is still in request by those who have grown it, but seed has not been imported from there of late years.

Seed from the Argentine—to avoid the pitfalls of nomenclature—is considered to grow somewhat coarser than that from Australia, and to take the rust in early stages, but to be capable of throwing it off on account of its vigorous later growth, whereas Australian seed seemed to be practically immune to the fungus, and be somewhat less thick in the straw, though still far coarser than the old Cape variety. At no time very markedly different, growth under Cape conditions for a few years has rendered differentiation still more difficult. Each sort has its supporters, but it is worth considering whether it would not be better at shows, while offering prizes for (1) the true old Cape oat and (2) for side oats, when grown to denominate the others simply as (3) "Algerian type" subdividing again into classes from within thirty miles of the sea and from beyond that limit where considered desirable.—E. A. N.

Proved Varieties of Fruit for Orcharding.

Mr. H. Dugmore, of Glen Hope, near Grahamstown, writes:—More than ten years have passed since I came to the Bathurst district for the purpose of fruit growing. One of the first difficulties to be faced was the choice of varieties. The nurserymen of both Eastern and Western Provinces advertised endless varieties of fruits, many of them highly recommended by growers in other parts of the world, but no one was able to tell the "would-be" fruit grower what would be suitable for this country, especially the Eastern Province. About this time our Government were asked to establish orchards in different parts of the Colony, but this request was not complied with, so there was nothing for it but for farmers to do their own experimenting. The Government did send us fruit experts, but unfortunately these gentlemen did not know much of the capabilities or requirements of the eastern districts, so that in some cases the advice given was wrong and misleading. Farmers were thus forced to depend on themselves, and many have been the disappointments when, after years of hard work and patient waiting, it was found that a large proportion of the trees planted were unsuitable, and had to be re-grafted or taken out by the roots, and replaced with suitable varieties. Farmers who have gone in for extensive planting will by this time have gained very useful information, and I think the time has come when we might, to our mutual advantage, publish in the *Agricultural Journal* a list of names of varieties of fruits found to succeed. If you think such an idea worth carrying out, I will be pleased to give my experience in this line in the Bathurst district. Different farmers will have planted different varieties, so that what I suggest may be to our mutual advantage.

We consider the suggestion a good one, only provided that all who give their experiences will make the notes sufficiently full as to periods and conditions in which the varieties have succeeded.

Locusts.

Mr. R. F. Weir, of Bolotwa, writing to the Entomologist at the end of November, says:—You probably have some farmer reporting on locusts in Whittlesea direction, but as I have sent reports of these I will again refer to them. The locusts hatched out in great numbers on the farms Tyldendale, Welcome Valley, Gladstone, and Mr. Lean's farm; that is, on the banks of the Zwart River on the left of the road to Whittlesea from Queenstown. They were vigorously attacked by the owner of the three farms mentioned, and also by Mr. Lean, and have all been killed off. It meant three weeks' hard work every morning and evening tramping with sheep and goats and spraying with soap. Many of the small stock are lame still from the effects of tramping. Had these locusts been allowed to proceed unmolested, probably thousands of pounds' worth of damage would have been done by them. I hear there are swarms of "voetgangers" doing well on the banks of "Klaas Smits" River near Queenstown.

Fertilizers and Stimulants.

The idea of artificial manures being only a stimulant like *dop* is a very common one. The simile is so nice, people are apt to run away with it and take it too far. Artificial fertilisers enable one to get in one season what otherwise might only be realised in two or three if no manure were used, but the user has the profit in his pocket in place of in the soil. And to get another crop one must re-invest one's capital every year, and every year get it all back with interest. That is the way to look at it. Hence it comes that once the cultivator begins to work with concentrated active artificial manures he must go on ever afterwards putting in and getting out.—E. A. N.

Manures for Mealies.

A correspondent asks what kind of artificial manure is best for mealies. There is no "best" manure for mealies. What to apply depends on a variety of circumstances and the peculiarities of soil, climate, and methods of culture. The most suitable manure for any particular case can only be ascertained by trial. It would probably be safe to try Government guano at the rate of 400 to 600 lbs. per morgen, or 200 lbs. superphosphates and 150 lbs. sulphate of potash, and 150 lbs. nitrate of soda per morgen. But this is only generally appropriate and cannot be described as the best.—E. A. N.

Sulphur Compounds for Scab.

Mr. W. Roe writes:—The substitution of caustic soda for caustic lime has been much discussed by farmers. Thinking that if soda is used instead of lime to dissolve sulphur they will avoid the possible damage to the wool—a damage very much over-rated, and often when it does occur due to the general but mistaken impression that the lime is an important part of the dip as a cure for scab, instead of looking on it only as a means of dissolving the sulphur, and that all the lime not needed for that purpose should be vigorously excluded from the dip. Now it is expected that if soda is used instead of lime, perfect sulphur compounds for the cure of scab will be easily made, and there will be no danger from excess of the caustic solvent to sheep or wool. But, what is true of a good sulphur dip made at its best, namely, that the *largest quantity of sulphur* to the *caustic solvent* must be got in the dip, is as true of the soda compound as it is of the lime one.

In the experiment made by Mr. W. Robertson, and reported in the *Agricultural Journal*, No. 1 shews at once that it was not so perfect as it might have been—as if there is no undissolved sulphur, it is fairly sure there is an excess of caustic soda. Had lime been used, it would have shewn its excess because it is insoluble. The excess of soda is not seen; it is very soluble, and in this No. 1 there would have been risk of harm or annoyance to both sheep and dippers.

No. 2 is much better in proportion, shewing the full amount of sulphur is dissolved by its dark colour and excess undissolved. A better and safer dip.—When the farmer has been so unfortunate as to have his sheep infected with long wool on, this dip might have some advantages. It is good and safe, because it has as much sulphur as possible dissolved, and thus can be effective where much diluted, as with long wool a much larger quantity of dip is taken out by each sheep. The full dose of sulphur is there to do its work—an all-important condition as a cure for scab. That can be got as well with caustic lime as with caustic soda, and at very much less cost.

Lime is a very variable article, and that is a great source of uncertainty as to the best proportions. But pure caustic lime, given weight for weight, will dissolve and combine with quite as much sulphur as caustic soda (in fact, rather more). But as pure lime is not to be had, more has to be used to a given weight of sulphur to ensure a good dip. The lime should be, after slacking (if it has not been already done, as it usually is here), passed through a fine sieve. What passes is mixed with sulphur in water to a cream. This should be poured into the boiling water a little at a time, as recommended by the Agricultural Department. When thus mixed, the action of the boiling is much quickened. To ensure an excess of sulphur, some should be put into a canvas bag and suspended in the boiling liquid. This will ensure full saturation of the lime used, and the excess in the bag can be used again in another cooking.

The practice of putting the lime into the water, boiling it and adding the dry sulphur, is very faulty. Lime is very insoluble in boiling water, more so than in cold water. So cooking the lime first does not help. Adding dry sulphur is a wrong practice. Sulphur does not wet easily, and I have seen the sulphur dancing with the steam bubbles on the surface, not even wetted to combine, whilst the farmer grumbled at the time required to cook his dip.

With a large, deep boiler, a good plan is to put the whole of the sulphur and lime cream used into a colander, or oil can with fine holes in it: suspend this in the boiling pot, and boil away. A fine dark orange clear liquid dip is the result. The bag of sulphur suspended also ensures a full dose of sulphur in case there may be too much lime used. Boiling is easier, if there is no mass of insoluble lime at the bottom of the pot.

Sulphur and lime well made is the best and cheapest dip, and the scare of wool injury, made so much of, need not prevent its use, with a full dose of sulphur dissolved, and all free lime carefully kept out of the dip.

That very unchemical and impossible mode of dip making with caustic soda and sulphur in the cold, tried by Mr. Robertson, ought to be enough to settle in our farmers' minds *how not to do it.* It is cruel, both to sheep dipped and dippers. It is an impossible way of making a good sulphur dip.

Yellow Liver in Ostrich Chicks.

Mr. Walter Doubell, writing from Steytlerville, asks: "Can you, through the medium of your Journal, throw any light upon a certain disease prevailing amongst my ostrich chicks, and known to us in these parts under the name of "Geel Lever." The symptoms are not distinctive. The bird simply stands with its head drawn back, and staring feathers, and remains in that position for some time until its legs becoming too weak to support the body, it settles down and dies within twelve hours after shewing the first symptom of the disease. I have opened up several birds, and have in every case found the liver to be of a yellow colour, with red blotches here and there. Intermixed with the entrails I also found a quantity of fluid matter perfectly colourless. I could find nothing abnormal in the appearance of the stomach, which to all appearance was perfectly sound. The chicks have been liberally fed on lucerne, prickly pear leaves and bran, and have always received careful attention The birds sleep under cover every night. This disease is very prevalent this year in the district, and no one seems to know the cause of it or of any remedy to stay its course."

Yellow liver in ostrich chicks was fully dealt with in the *Agricultural Journal,* Vol. XX., No. 13, by Mr. D. Hutcheon. In concluding that article the writer says:—"In the absence of any direct evidence as yet discovered of the presence of a special disease, I am strongly of opinion that the so-called yellow liver of ostrich chicks is due more to congenital functional debility, more particularly of the liver and digestive organs, than to any specific infectious disease, and that its origin and cause must be sought for in the feeding and management of the parent birds. In fact, it bears a very close resemblance to that affection of the stomach of young lambs known by the name of bloedpens, which is prevalent in certain seasons.

"If this opinion be correct, the remedy will be obvious, although it may not in all cases be so easy of application. I am perfectly aware that on many farms, more especially during periods of protracted drought, it is a most difficult and expensive matter to provide a sufficient quantity of suitable food to supplement the deficiency of the veld, still it is equally true that nature will not relax her demands because we are not in a position to comply with them. It is no use, therefore, to look around in search of some panacea to avert the consequences of our neglect or inability to comply with nature's requirements. Medicines of a suitable character, especially such as supply the deficiency of certain mineral constituents in the food, as salts of soda, potash, sulphur and lime, more particularly the phosphate, are very beneficial; but although these substances undoubtedly benefit the constitution by supplementing the mineral deficiencies in the food, it must be clearly understood that, valuable as they are, such substances are not food, and cannot be made to act as a substitute for it.

"*Treatment.*—The curative treatment of yellow liver in ostrich chicks has not been very satisfactory hitherto. The principal aim should be to limit the quantity of food allowed to these delicate chicks, so as not to overtax their weak stomachs, and to allow them plenty of healthy exercise; in fact, as already remarked, a larger proportion manage to struggle through the critical period by being turned adrift on the veld, and compelled to forage for themselves, than by nursing and feeding them at home. Still, a laxative diet is undoubtedly indicated, and green succulent food is the best for that purpose. They should, however, be allowed very little at a time to keep their appetites keen, and never satiated."

Tobacco at Kuils River.

Mr. C. P. de Villiers, writing from Kuil's River, says:—I wish to express my thanks for the very explicit directions for curing and growing tobacco. I find that tobacco can be grown here and on ground, too, where only wattles were thought to grow; that is, on the sand hills outside garden ground. Of its quality I will at this stage only state that it burns well, almost as well as American Kentucky Leaf. I have dried some of the "Sand goed" in a modified way "of flue curing," and while writing am smoking as decent a pipe of tobacco as I ever had from across the Atlantic. The leaves were gathered in a *green state*. I think that formerly people must have planted tobacco in the vlei ground, and, that being "brak," spoiled the tobacco, so giving rise to the idea that it could not be grown here. There are acres upon acres of ground where decent tobacco could be raised. The difficulty is in getting the water to the surface for irrigating. The water is there if we could only command the capital to buy the pipes necessary. What we want is 4½ to 6 inch pipes to put into the ground, and 1½ inch pipes for delivery on the ground.

A Remarkable Storm.

The R.M. of Nqamakwe supplies the following report of a remarkable storm which visited that village:—This Magistracy was yesterday (October 15) the scene of a hail storm of most unusual severity. After eight days of almost continuous rain, yesterday morning broke fairly clear, but with indications of the approach of an ordinary thunderstorm, which increased as the morning progressed. About noon, the sky was completely overcast by thunder clouds, and the severity of the storm burst about fifteen minutes before 2 o'clock p.m., commencing in light hail, which, however, quickly increased to a deluge of hailstones of great size, many being from ¾ inch to 1 inch in diameter. The downfall lasted for about ten minutes, and at the end of that time the aspect of the village was such as follows a heavy fall of snow, the hail stones having accumulated and drifted to such an extent that the street and commonage were perfectly white with them, and the water rushed down the general slope of the village in streams. Such crops as were already grown in the village gardens were completely destroyed, and the fruit trees were stripped of their fruit, and flowers beaten to pieces. Seven panes of glass in the windows of the local gaol, and about twenty panes throughout the village, were smashed by the force of the hail stones, and the water entered freely into several dwellings. The older inhabitants of the village state that no storm of such severity has previously visited the village within the range of their recollection. One peculiarity of the downfall was the narrow limits within which it was circumscribed. Commencing at Ncisininde in the neighbourhood, it appeared to spend its whole force on the village and its immediate vicinity; and it was remarkable, when afterwards viewed from the verandah of the public offices, that on neighbouring ridges there was no sign of hail to be seen, while the greater part of the reserve was mantled as with snow. Having spent its brunt on Nqamakwe, the storm passed away to the south-east. It was accompanied by thunder and lightning, but these features were not more than ordinarily marked. In the direction in which it travelled, hail fell for a distance of some five or six miles, but the width of its course could hardly have been more than a mile.

A NEW DEVICE FOR COOLING WINE.

By Frederick T. Bioletti.

Reproduced, with illustrations, from Bulletin No. 174 of the Agricultural Experiment Station, of the California College of Agriculture.

In planning for the series of wine-making experiments detailed in Bulletin No. 177—[" A New Method of Making Dry Red Wine," republished in the *Agricultural Journal* for November and December]—it was necessary to devise a cooling machine, both for the reduction of temperature of the heated must and for the control of the temperature of fermentation. While the machine made was intended only for a temporary and special purpose, it proved so efficient , and is at the same time so simple in construction and of such moderate cost, that it will be found useful in nearly all wineries where any attempt is made to keep the temperature of the fermenting wine within the most favourable limits. For this reason the construction and work of the cooler are described here, together with some of the preliminary tests made with small models before the full-sized machine was constructed.

Description of the Cooler.

The machine consists essentially of a copper tube 220 feet long and 1¼ inches in diameter, through which the wine is pumped and which is inclosed in a canvas irrigating hose 4 inches in diameter, through which cold water runs in a direction opposite to that of the wine. The whole is supported on a wooden stand, as shewn in herewith, where the cooler is shewn in operation.

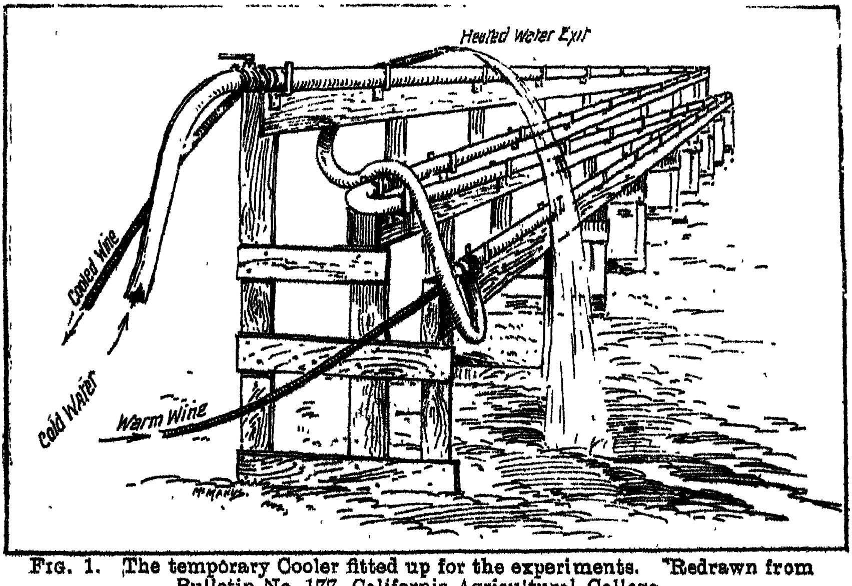


Fig. 1. The temporary Cooler fitted up for the experiments. Redrawn from Bulletin No. 177, California Agricultural College.

CAPACITY OF THE COOLER.

The capacity (that is to say, the amount of wine which can be cooled in a given time) of any cooler of this type will depend on the number of degrees which the wine is lowered and on the difference of temperature between the wine and the water. The tests shewn in Table I indicate that 1,000 gallons of must at 140° F. can be lowered 50° F. (viz., to 90° F.) per hour by the use of 1,110 gallons of water at 71·5° F. (see test 8.) If the hot must has a temperature of 125° F., the same amount will be lowered by the same amount of water of the same temperature 41° F., or to 84° F. (see test 9). As fermenting wine never attains such high temperatures as these, test 10 is interesting as indicating what can be expected from the machine in controlling the temperature of a fermenting vat. This test shows that 1,000 gallons of fermenting wine can be lowered from 95° F. to 78° F. (viz., 17° F.) in one hour by the use of 850 gallons of water at 71·5° F.

COMPARISON WITH OTHER COOLERS.

In order to compare the work of this cooler with coolers of other forms, a factor was calculated representing the number of gallons of wine cooled per hour 1° F. per unit of surface, and for one degree of reduction of temperature of the wine, and for one degree of difference between the temperature of the hot wine and of the cool water.

Given :

R - Number of gallons of wine cooled per hour.
F - Number of degrees Fahrenheit wine is lowered.
D - Number of degrees of difference between the temperature of the hot wine and of the cool water.
S - Number of square feet of surface of cooling tube.
K Number of gallons per hour cooled 1° F. per square foot of S and per each degree of F and each degree of D.

Then,

$$K \quad \frac{R \times F}{D \times S}$$

This factor K will doubtless vary considerably according to whether we are dealing with liquids very near together or very far apart in temperature, or if we pass very small or very large volumes of wine through the machine ; but within the limits of practice, it was found very constant and gives a very simple and accurate measure of comparison between different machines and different ways of using the same machine. For purpose of comparison, observations were made on two other wine-cooling devices. One of these devices consisted of a length of iron water-pipe placed in an irrigation ditch, and was used for cooling sherry in taking it from the heating house to the storage cellar. The piping consisted of 400 feet of 1-inch and 200 feet of 1½-inch iron water-pipe, through which the wine was pumped. The test of this device is shewn under No. 11 in Table I.

TABLE I.

Tests of Cooling Machines.

Test.		WATER.			WINE.			R	F	D	K	S.
		Rate	1st Temp.	2nd Temp.	Rate.	1st Temp.	2nd Temp.					
1	End closed....	450	71·0	91·0	550	99·0	79·0	550	20·0	28·0	5·46	72
2		750	71·0	82·0	550	94·0	76·0	550	19·0	23·0	5·98	72
3		750	71·0	81·0	550	92·0	75·0	550	17·0	21·0	6·18	72
4	End open; much leakage........	900	68·0	109·0	900	117·0	91·0	900	26·0	49·0	5·27	72
5		900	68·0	98·0	1,000	102·0	84·0	1,000	18·0	34·0	7·35	72
6		900	68·0	92·0	900	95·0	82·0	900	13·0	27·0	6·02	72
7		900	68·0	.. ..	900	82·0	77·0	900	5·0	14·0	4·46	72
8	End open; little leakage........	1,100	71·5	114·0	1,000	139·0	89·5	1,000	49·5	67·5	10·19	72
9		1,100	71·5	106·5	1,000	127·0	86·0	1,000	41·0	55·5	10·26	72
10		850	71·5	88·0	1,000	97·0	79·5	1,000	17·5	25·5	9·53	72
11	Sherry C... ..	......	82·0	......	1,500	120·0	93·5	1,000	26·5	38·0	5·68	184
12	U. C...........	500	75·0	......	2,400	101·0	88·0	2,400	13·0	29·0	5·75	187

R = Number of gallons cooled per hour.
R = Number of degrees F. wine is lowered.
D = Difference between temperature of hot wine and cool water.
K = Gallons per hour cooled one degree per square foot, and degree, etc.
S = Number of square feet of surface of cooling tube.

The other device consisted of an ordinary beer wort cooler, but the wine instead of flowing over the outside was pumped through the tube and cooled by allowing the water to drip over the outside

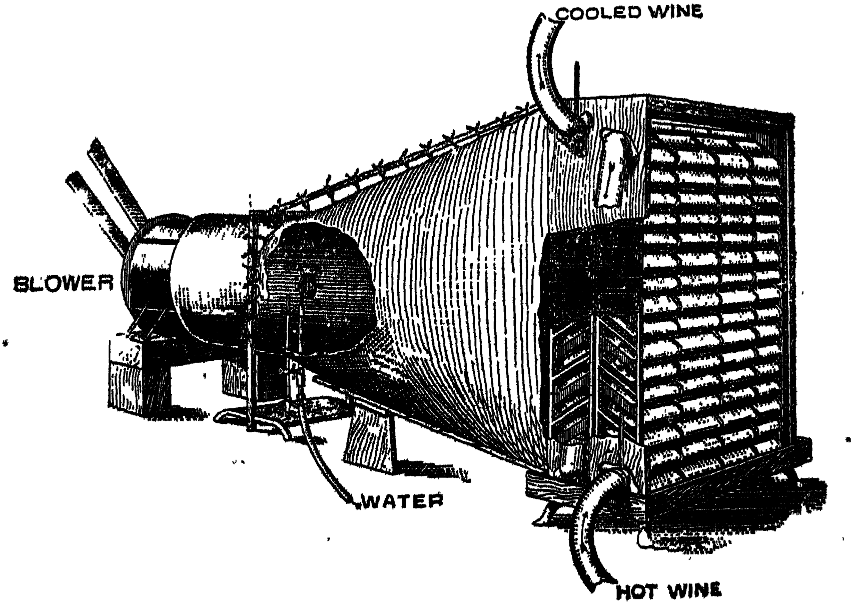


Fig. 2. University air-blast cooler.

of the battery of tubes. The cooling was made more complete by the use of two propeller fans, which caused a strong current of air to pass over the surface of the tubes and cool the water by evaporation. The test of this machine is shewn under No. 12 in Table I, where it is indicated by the letters U. C., meaning "University Cooler," as it is identical in principle with the cooling machine invented at the Berkeley Experiment Station, (See Fig. 2.) The first of these machines is useful for the purpose intended, and requires little attention, but would be of little use in controlling the temperature of fermentation, owing to the high temperature of the water in the irrigating ditch during the vintage. Moreover, by comparing the factor K in test 11 with that of test 9, it will be seen that for unity of surface it is little more than half as efficient as the machine used in our experiments, notwithstanding the fact that it was supplied with a practically unlimited amount of cooling water.

The efficiency of the U. C. machine, as indicated by the factor K of test 12, is little larger. The principal merit of this machine is that it uses little water. The present machine uses between four and five times as much for the same effect. This would be a disadvantage where water is scarce, and it was for such cases that the U. C. machine was recommended. Where the cost of water is merely nominal for the amounts necessary, as it is in most California wineries, the possibility of cooling nearly twice as much wine in a given time with a machine of the same size of our present construction is a great advantage.

Several cellars in California have installed a cooling device consisting of a system of iron water-pipes arranged in various ways in the interior of the fermenting vat itself. The pipes are usually arranged around the cask at a few inches from the staves, but are sometimes placed in an upright series in the middle of the vat extending from one side to the opposite, and from the bottom to the top. The wine is kept cool by running water through this system of pipes whenever the temperature rises too high. With such a device it is possible to control the temperature, but in order to keep the temperature approximately even in all parts of the vat, constant stirring during the tumultuous fermentation is necessary. This is troublesome, and with very large vats impossible. Instead of stirring, the temperature may be equalized by pumping the wine over from the bottom of the vat to the top of the pomace; but if this method is used, more pumping is needed than is necessary for our machine. The amount of water necessary to obtain the same effect is about twice that used in our cooler. The principal defect in this device, however, is the difficulty of removing the pomace and the cleaning of the vat, owing to the presence of the network of pipes and supports. It is also expensive to install, as a series of cooling pipes must be placed in every vat. Moreover, although it has been shewn that a limited exposure of the wine to contact with iron has no bad effects, it is probable that the continued presence of so much iron piping in the wine for four or five days would have an injurious effect.

Copper or Iron Pipe.

Though the machine is by no means expensive, it could be made for little more than half the cost if it were possible to use iron pipe instead of copper tubing. Iron being a poorer conductor of heat than copper, an iron pipe would be less efficient than a copper tube, but tests with a small model of the cooler indicate that there would be a loss of only about 10 per cent in efficiency, which would not counterbalance the difference of cost. The acids of the wine act more energetically on iron than on copper, but the time during which the wine is in contact with the metal is so short that this need not be taken into account. To test this, a piece of ordinary black iron water-pipe was immersed in red wine and left there sufficiently long to make the time of contact one hundred times what would occur in a single cooling of the wine. The wine was then heated to 100° F. and left again in contact for twenty times the length of an ordinary cooling. At the end of this time, the colour of the wine had not been affected at all, either in tint or intensity. Twenty-four hours later the wine was examined again by means of a Salleron vino-colorimeter, and no change could be detected. As iron salts act very rapidly on the colour of red wine, this may be taken as proof that no ordinary cooling through iron pipes would affect the wine in the least. Moreover, in most cellars now, the must is pumped from the crusher to the vats through iron pipes without any injury. In Algeria, after many attempts to find a suitable coating for the inside of the iron tanks used in transporting wine from outlying wineries to central storage cellars, it has been found best to leave them uncoated and no deleterious effects follow.

Galvanized iron pipes, however, should not be used, as the zinc is soon corroded by the wine, and the zinc salts which thus get into the wine are poisonous and might cause the wine to be rejected if exported. We cannot, however, recommend iron pipes at present for use in a cooling machine, as we have not yet tested them on a practical scale. There is danger that, owing to the roughness of their interior surfaces, they might retain the sediment and choke up.

The Water Hose.

The exterior tube through which the water runs and the function of which is to keep the cool water in contact with the tube containing the hot wine, may be made of metal or any substance that will conduct the water.

For reasons of economy and ease of construction a canvas hose was chosen. Woven cotton and linen fire-hose were first tested and found perfectly satisfactory. As soon as the tissues of the hose were thoroughly soaked with water, the leakage was reduced to a simple sweating. This sweating, as will be shown later, is a distinct advantage, as it permits a certain amount of evaporation, which has the effect of cooling the water and thus increasing its effect on the cooling of the wine.

As woven hose is very expensive, a test was made with ordinary sewn canvas irrigating hose. In the preliminary trials it seemed that all the hose of this kind procurable leaked too much to allow any benefit to be obtained from the evaporation, and a great deal of water escaped before its cooling power had been completely utilized. As there was, however, an abundance of water available at the cellar where the experiments were to be tried, it was determined to use this kind of hose in the construction of the cooler.

Various kinds of canvas were tried and their relative rates of leakage determined under conditions as near those of practice as possible. The amount of leakage was found to vary very much with different qualities of canvas. In general, the stronger and coarser canvas leaked the most, though the very fine canvas also leaked more than the medium grades. It is possible that in time, after long use, the heavier grades would have ceased to leak so copiously, for the grade which was adopted leaked much less in actual practice after it had been it use for a few days than had been anticipated after the laboratory tests. The grade adopted was Neville's No. 10. The grades lighter than this seemed hardly strong enough, and the heavier leaked more.

Even the No. 10 canvas leaked so much at first that during the first cooling experiments the exit of the hose was kept closed, and all the water used was forced by the pressure through the pores of the canvas.

When used in this way the efficiency of the machine was much diminished, as is seen by comparing the factor K of tests 1, 2, and 3 in Table I with that of tests 8, 9, and 10. When the leakage had been diminished as much as possible, the efficiency of the machine was nearly doubled. The reason of this is, of course, that when excessive leakage occurs a great part of the water escapes before its cooling capabilities have been utilized.

The best method of diminishing the leakage was found to be, after setting up the machine, to close the exit of the hose and then allow the water to enter at full pressure. There is no danger of bursting the hose unless there is an excessive supply of water, as 240 feet of 4-inch hose was found at first to be able to leak 750 gallons per hour under a pressure of about 40 feet, coming through a 1-inch water-pipe. In an hour or two the leakage diminishes considerably, and then, when the exit is opened, it becomes very little. Each time the machine was used, the leakage became less, until after the third or fourth day the leakage was little more than was needed to keep the outside of the hose moist and so obtain the cooling effect of evaporation. Each time the hose was filled, after having been allowed to become dry, it was found necessary to swell it up again by closing the exit at first. This required only a few minutes, however, and not an hour or two as when the hose was new.

An improvement on the design of the machine would be to let the hose lie in a half-round gutter exactly fitting the hose. This would cause most of the leakage to be through the upper part. In this way all the water which escaped would be warm, and the efficiency of the machine would be increased by getting rid of it. In the machine as actually constructed the hose lay on the edge of a straight board, one inch thick, the object being to expose as much surface as possible to the evaporating effect of the dry air. While the machine was working, the difference of temperature between the upper and the lower surfaces of the hose was marked, the water, as it was warmed, rising and flowing in a stream overlying the cool stream of water below. As undoubtedly, owing to the greater pressure, more than half of the leakage took place on the lower half of the surface of the hose, a means of causing all the leakage to be at the expense of the warmer water in contact with the upper surface might be an advantage.

COOLING DUE TO EVAPORATION.

In the preliminary tests, made before constructing the machine, it was found that more cooling was obtained than could be accounted for by the rise of temperature of the water used: that is to say, the warm stream was cooled more than the cool stream was warmed. This could be accounted for in the model only by the cooling due to evaporation from the hose as the water passed through. Calculations based on tests made with the model showed that this cooling would amount to a little more than 0·5° F. with a machine of the size of the final cooler when passing 1,000 gallons of wine per hour under the atmospheric conditions surrounding the model. The relative humidity of the air when the tests were made was 60. The mean relative humidity of the air at Fresno during the month of September is given by the Weather Bureau as 42 as an average of twelve years, and as the cooler is used principally during the day when the air is driest, it was expected that the cooling due to evaporation would be much greater in practice than was indicated by the tests of the model.

This expectation was abundantly verified by the practical tests of the large cooler used at Fresno. The following table is calculated from the data given in Table I:

TABLE II.

Comparison of Heat lost by Wine, and of Heat gained by Water.

Experiment.	Calories lost by Wine.	Calories gained by Water	
1	1,000	819	End of hose closed
2	1,000	833	
3	1,000	802	
4	1,000	1,577	End of hose open, much leakage
5	1,000	1,500	
6	1,000	1,816	
8	1,000	926	End of hose open, very little leakage
9	1,000	939	
10	1,000	802	

In the first three experiments, where the exit end of the water hose was closed, the cooling by evaporation is shewn by the table above to be considerable, and corresponds to a lowering of the temperature of the water 3° F. In the second three experiments there is an apparent reversal of this effect, due to the fact that the temperature of the warmed water was taken as it emerged from the exit. This did not give the average temperature of the water, but something higher, as the warmer water in the upper part of the hose travelled more freely and reached the end, while much of the cooler water escaped by leakage before it reached the end. When the hose leaks as much as it did during these experiments, much of the cooling power of the water is lost and the use of the semi-circular trough suggested above would be very effective.

When the leakage had diminished to a mere sweating of the hose, as in the last three experiments, the cooling effect of evaporation is again evident. In experiments 8 and 9 this effect corresponds to 2·5° F. and 2·3° F. respectively, while in experiment 10, where the water was passing more slowly, it is increased to 4·1° F.

In the first three tests some of the difference shewn between the rise of temperature of the water and the fall of temperature of the wine may be due to the difference between the specific heats of water and of half-fermented wine. The latter difference, however, is too small to account for all of the former. In the last three experiments this source of uncertainty is eliminated, as warm water was used instead of wine in making the tests.

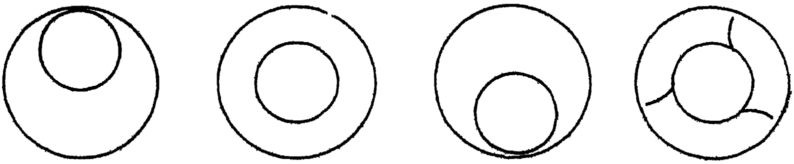
Under average working conditions in a dry climate it may be expected that the results of evaporation from the canvas hose will be equivalent to the use of water about 3° F. cooler in a machine where this evaporation could not take place.

EFFECT OF SUNSHINE, SHADE, AND WIND.

The machine should be placed in such a position that the greatest possible benefit may be derived from the effects of evaporation. This will be in a *shady* place where the canvas hose is exposed to the full force of any wind that may be blowing. It should not be inside a building where it is protected from the wind, and where the air may be rendered moist by the vapours given off by fermenting wine or by water used in washing. The heat and dryness outside promote evaporation from the hose, and consequently increase the efficiency of the cooler. The direct rays of the sun, however, should not strike the cooler, for in this case the radiant heat will warm the water more than the evaporation cools it. In a test with a small model cooler it was found that where in the shade the water was cooled 0·5 F. by evaporation, the resultant of the effects of radiant heat and evaporation in direct sunshine was a rise of 1·25° F.

Relative Positions of Canvas Hose and Copper Tube.

Tests were made with a small model to determine the effect of placing the copper tube in different positions in the canvas hose.



A—10·0° F. B—15·3° F. C—15·6° F D—16·0° F.

Fig. 3. Comparative cooling, corresponding to different positions of tube.

Four tests were made, as indicated in Fig. 3. In A, the tube was placed as near the upper part of the hose as possible; in B, in the centre; in C, as near the lower part as possible. In D, spiral flanges were soldered to the tube, with the object of making the stream of water circulate around the tube in its passage from one end of the hose to the other. When the tube was placed near the upper part of the hose the wine was cooled less than two-thirds as much as when placed in the other positions. The most effective method was where spiral flanges were used, but the superiority over the plain tube when placed in position C was so little that it would not repay the extra expense and trouble involved in the use of the flanges.

The position C was adopted in the construction of the machine. This is the position the tube and hose naturally take when the hose is inflated by the pressure of the water, if they rest on a flat, continuous surface. The tube is kept in a position which leaves a small space between it and the lower surface of the hose by means of the couplings which are necessary to join the 20-foot lengths of copper tubing which were used in the construction of the machine. These couplings should be as small as practicable. A hose coupling is too large and would obstruct the passage of the water too much. A very good coupling was designed by Mr. Meakin, which projects only one quarter of an inch from the tube and was found to answer the purpose perfectly. Fig. 4 shews the relative positions and actual sizes of hose, tube and couplings, and support. The small space between the lower surface of the copper tube and the hose is an advantage, as it increases the cooling surface in contact with the cooler water, which has a tendency to run along the lowest part.

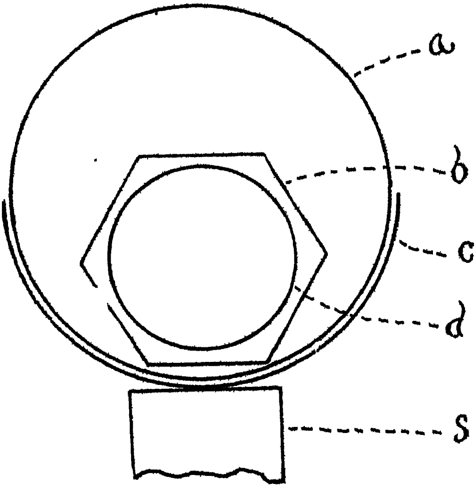


FIG. 4. Cross-section of cooler shewing relative positions of hose, tube, support, and proposed gutter. *a*, canvas hose; *b*, couplings of copper tube; *c*, gutter; *d*, copper tube; *s*, support.

SUPPORT OF COOLER.

The cooler should be placed on a support that raises it a few feet from the ground, both for convenience of working and to expose it more perfectly to the wind.

In order to control the amount of leakage, and to prevent more leakage in one part of the machine than in another, some method must be adopted of varying and equalising the water pressure in all parts of the hose. This it was found possible to do in the machine constructed by the means indicated in Fig 5. The 220 feet of tubing was made in four lengths, joined by three semi-circular bends, as shewn in the figure referred to. The support was built to give a fall of 8 feet in the entire length, and as the water passed from the upper end to the lower the fall tended to restore the pressure lost by friction and leakage. The amount of pressure was determined by 8 or 10 feet of rubber wine hose attached to the lower end through which the water escaped. By raising the end of this piece of hose, as at E_1, the pressure could be increased, and by lowering it decreased to any required degree. For the purpose of swelling up the canvas hose a maximum pressure was obtained by screwing a cap on the end of the hose at E_1. When the machine is in working order, the best height for the exit E_1 is easily found by trial.

The wine enters the lower end of the machine at W and escapes at the upper, W_1. This upward passage of the wine is desirable, as it prevents any interference with the flow due to the gas given off freely by the fermenting wine. The gas is carried upward regularly and perfectly.

TEMPERATURE OF THE WATER.

A certain amount of cooling will be obtained whatever the temperature of the water, provided it is lower than that of the wine, but the cooler the water the more effect it will have. This is shewn by the following tests made with the model cooler :

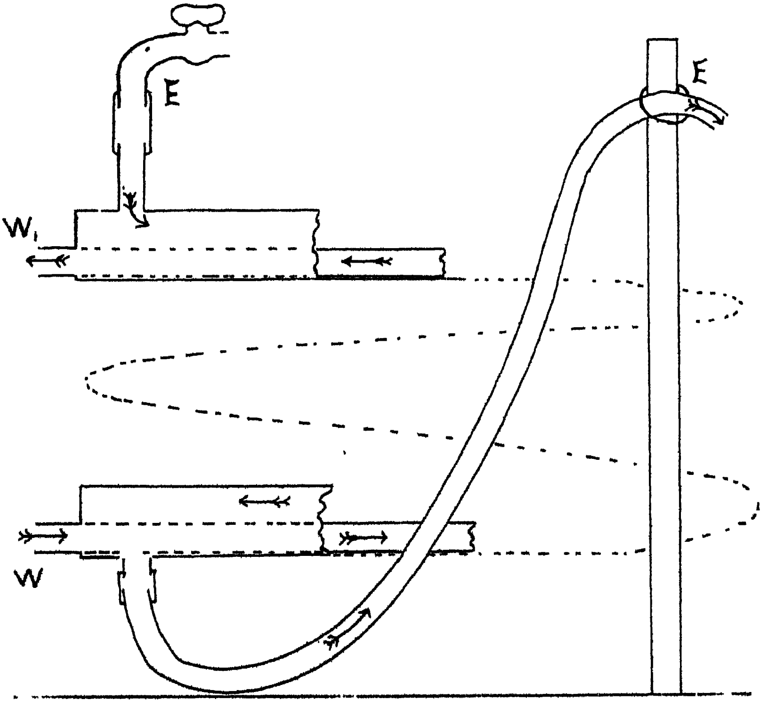


FIG. 5. SCHEME OF COOLING MACHINE.

W - - Entrance of warm wine.
W_1 Exit of cooled wine.
E - Entrance of cool water
E_1 Exit of warmed water

TABLE III.

Comparison of the Effects of Water of Different Temperatures.

Temperature of Water.	1st Temp. of Wine.	2nd Temp. of Wine.	Degrees Cooled.
65° F.	92° F.	82·0 F.	10·0 F.
	92	85·5	6·5

Thus, with the same conditions of flow and of temperature of wine and water, water at 65° F. reduced the wine 10° F., and water at 75° F. only 6·5° F. In practice it will probably be found that the necessary efficiency will be obtained with this machine only if the temperature of the water available is at least 20° F. lower than that of the maximum temperature which it is desired the wine shall not exceed. That is to say, if it is desired to keep the fermenting wine below 92° F., the water used must not exceed 72° F. (See test 3, Table I.) When there is a difference of only 14° F., for example, the wine can be cooled only 5° F. at a practical rate. (See test 7, Table I.) This is too little for practical purposes. It is very necessary, therefore, that the water should be as cool as possible. For this reason it will usually be necessary to have a special reservoir or water tank for the use of the cooler

The water, as it came from the well which was used in our cooling experiments, had a temperature of 66° F., which was quite low enough for efficient cooling. After this water had been in a 20,000-gallon iron tank, covered above but exposed to the sun on the sides, for two or three days its temperature would often rise to over 80° F., which was much too warm for the purpose. Even during the vintage, when a great deal of water was being used and water was almost continually being pumped into the tank and drawn out, it was usually over 71° F. when it reached the cooler.

The water tank should be completely protected from the direct rays of the sun. The best way to do this would be to place a roof over it and then surround it with a screen which would keep off the sun but allow free circulation of the air. If the sides of the tank were covered with canvas kept wet by some automatic sprinkling device, it is probable that the water instead of becoming warmer in the tank would be cooled. If this were done, the tank might be made large enough to hold the water needed for several days

It would be possible to pump directly from the well into the cooler, but this would be less convenient, as it would necessitate a special pump and well for the purpose and would require more supervision.

Temperature of the Must or Wine.

With water at a given temperature, the hotter the wine the greater difference there will be between the temperature of wine and water, and therefore the more efficient the machine. Tests with the model cooler gave the following ratios :—

TABLE IV

Efficiency with Wine of Different Temperatures.

1st Temp. of Wine.	2nd Temp. of Wine.	Temp. of Water.	Degrees Cooled.
100° F.	86·0° F.	66° F.	14·0° F.
92	82·0	66	10·0
84	76·3	66	7·7

Thus, with all other conditions the same, the amount of cooling was nearly twice as much with wine at 100° F. as with wine at 84° F. The same is shewn to be the case with the large cooler, as may be seen by comparing tests 4 and 6, where, the other conditions being identical, must at 109° F. was reduced 26° F., and must at 92° F. only 13° F.

This shews that to obtain the maximum amount of work out of the machine the cooling should commence when the temperature of the wine is very near the maximum which it is to be allowed to reach. If the wine is to be allowed to reach 95° F., much time and labour is wasted by commencing to cool it when it has reached only 90° F., and still more if, as is sometimes advised, we cool the must before it has commenced to heat at all.

Ratio of Volumes of Wine and Water.—The less wine we pass through the machine per hour and the more water, the greater cooling effect we will obtain. If, however, we pass the wine too slowly, we do not get enough work out of our machine, and, on the other hand, if we pass the water too quickly, we lose too much of the cooling power of our water. The differences obtained with the model cooler with different ratios of water and wine are shewn by the following results of tests:—

			Degrees Lowered.
Rate of water equal to that of wine	..	..	10·0° F.
Rate of water 1½ times that of wine	..	..	11·3
Rate of water 2 times that of wine	..	..	13·2

These tests indicate that with a machine of this construction it would not pay to use more water than wine, for while an equal quantity lowered the wine under the conditions of the test 10° F., double this quantity lowered it only 3·2° F. more.

With the large machine it was found that satisfactory results were obtained when using a little less water than wine. (See test 10, Table I.)

RATE OF PUMPING.

The rate at which the wine should be passed through the machine to obtain the maximum efficiency is a function of the particular machine, and will differ according to its size. The machine used was found to work very satisfactorily when cooling 1,000 gallons per hour. (See tests 8, 9, and 10, Table I.)

In order to calculate the size of machine necessary to accomplish a certain amount of cooling with a certain amount of water at a given temperature, a formula deduced from that given on page 18 may be used:—

$$S = \frac{R \times F}{D \times K}$$

The factor K will undoubtedly differ according to the size of the machine and according to the diameter of the copper tubing used, but unless these are very different from the machine described here, it will be approximately equal to 9 within the limits of cooling that will be used in practice. If, then, we take K to be 9, the volume of wine (R) to be cooled per hour as 1,000, and the number of degrees (F) which it is desired to cool the wine as 15, we can calculate the required cooling surface (S) as follows :—

$$S = D \times \frac{15000}{9}$$

From S obtained in this way we can calculate the length (L) of copper tubing required according as we use 1¼-inch, 1½-inch, or 2-inch tubing, as follows :—

$L = S \times 3{\cdot}054$, for 1¼-inch copper tubing.
$L = S \times 2{\cdot}545$, for 1½-inch copper tubing.
$L = S \times 1{\cdot}909$, for 2-inch copper tubing.

The following table has been computed in this way for some of the commonest cases that are likely to occur :—

TABLE V.

Length of Cooler needed for Various Conditions.

R = Rate.	Temperature of Water.	Temperature of Wine.	D	F	K	S	L = Number of Feet Copper Tubing.		
							1¼-inch.	1½-inch.	2-inch.
1,000 gallons per hour	65°	95°	30	15	9	59·3	181	151	114
	65	92	27	15	9	65·9	201	168	126
	72	95	23	15	9	76·4	233	194	146
	72	92	20	15	9	88·9	272	226	170

With the large copper tubing, as indicated by certain tests made, it is probable that the efficiency would be a little less, so that it would probably be necessary to use a little more tubing than is indicated in the last column.

SPECIFICATIONS FOR A COOLING MACHINE.

In order to give an idea of the cost of a machine of this construction, the following list of materials is given for a machine suitable for the use of a cellar making not more than 300,000 gallons of dry wine during a vintage of thirty days :

Bill of Materials.

Copper tubing, 200 linear feet of 1½ inch.
Canvas irrigating hose of No. 10 canvas, 200 linear feet, 3 inches in diameter.
Two brass castings for the ends of cooler.
Nine couplings for copper tube.
Three copper semi-circular bends for tubes.
Three galvanized iron bends for hose.
Three pieces of galvanized iron piping for hose.
Half-round galvanized iron guttering, 200 feet.
Wooden stand.
Ten feet of 3-inch rubber hose, with cap.

The following table shews how much a machine of this size would reduce the temperature of wine at 95° F. and at 92° F. with water at 65° F. and 70° F., when working at the rate of 1,000 gallons of wine per hour and using an equal quantity of water:

TABLE VI.

Reduction of Temperature of Wine under Various Conditions.

Rate.	Temperature of Water.	Temperature of Wine.	Reduction of Temperature.
1,000 gallons per hour.	69° F.	95° F.	21° F.
	65	92	19
	70	95	18
	70	92	16

A machine of this size would be quite sufficient, if used ten hours per day under ordinary conditions, to control the temperature of the wine in a cellar which crushed 50 tons per day of red grapes for dry wine. By running the machine day and night the capacity could be more than doubled, which would be a sufficient safety factor to provide for extraordinarily hot weather or the crushing of more than the average amount during a part of the vintage.

There is also the possibility of the vats filled on separate days requiring cooling on the same day, but a competent wine-maker who attends to the proper starting of his fermentations can nearly always avoid this.

METHOD OF USING THE COOLER.

In order to obtain the full benefit of the cooling machine (that is, to use it with the greatest efficiency), certain facts must be kept in mind and a plan of cooling adopted in accordance with these facts.

Every gram of sugar in a hundred cubic centimetres of must in fermenting will generate enough heat to raise the must 2·34° F. This corresponds, very nearly, to the production of 2·34° F. for every degree Balling of the must. This heat is disposed of in three ways: (1) A portion is taken up by the must, which is thus raised in temperature; (2) another portion escapes from the must by radiation and conduction; and (3) the remainder should be removed by the cooler.

If we know how much heat will be taken up in the first two ways, we will know how much it is necessary to remove by the third.

To determine this we first calculate how much heat will be developed by the fermentation of all the sugar present, and add this to the temperature of the must. This will give us the number of degrees of temperature which must be disposed of in the three ways. For example, if the must has 24 per cent. sugar, there are 24 × 2·34 degrees, or 56° F. to be disposed of. If the grapes on crushing have a temperature of 70° F., and we are to allow the fermentation to reach a maximum of 92° F., they will take up 92 − 70, or 22° F. This leaves 34° F. to be removed by radiation and cooling. Experiments have shown that in the more usual methods of fermenting red grapes in California, about half of the heat generated by fermentation will be lost by radiation. Thus, 56 ÷ 2, or 28° F., will escape in this way. This leaves 34 − 28, or 6° F., to be removed by the cooling machine, if we desire the fermentation not to exceed a temperature of 92° F. To keep it below 90° F. we should have to remove 8° F., while if we are to allow it to reach 98° F. no cooling at all will be necessary.

TABLE VII.

Removal of Heat by Radiation and by Cooling.

Experiment.	First Temp.	Max. Temp.	Last Temp.	Sugar Fermented	Degrees F Generated.	Degrees F Removed. by Cooler	Degrees F. Lost by Radiation	Number Days in Vat.
No. 1	84	96	93	21	49	20	20 = 41%	1
No. 2	71	96	91	19	44	6	15 = 34%	8
No. 3	74	98	90	17	40	8	18 = 45%	6
No. 7	81	98	92	17	40	0	29 73%	4
No. 9	81	92	79	21	57	27	35 61%	3
							Mean 51%	

Table VII shows the amount of heat removed by radiation in five of the experimental fermentations made at Fresno. The amounts vary considerably from 34 to 73 per cent. The cause of this is that the fermentations were experimental and conducted in various ways. The average of all is, however, 51 per cent., or about half.

The amount of heat lost by radiation will depend on the outside temperature surrounding the vat, the size and shape of the vat, and the amount of stirring and pumping-over that is practiced. For the purposes of our calculations it may be taken that in ordinary open fermenting vats not exceeding 3,000 gallons capacity, the loss will be 50 per cent, except in the hottest weather. In larger vats up to 10,000 gallons capacity, and in very hot weather, the loss may be no more than 38 per cent.

Using these figures we may calculate the amount of cooling necessary, as follows:

Let—

S = Sugar (% Balling) contained in the must.
T = Temperature of contents of vat.
M = The maximum temperature desire
C = The number of degrees necessary to remove by cooling.

Then,

$C = 1{\cdot}17\,S + T - M.$

Example:

$S = 24\%$; $T = 80°$ F.; $M = 92°$ F.

Then,

$C = (1.17 \times 24) + 80 - 92 = 16.$

In this case, therefore, it would be necessary to remove the equivalent of 16° F. from every gallon of fermenting grapes in the vat.

This formula may be used at any time, but it is best to wait until the temperature of the fermenting vat nearly reaches the desired maximum before making the calculation and before commencing the cooling.

The calculation is less liable to error at this time, because the grapes and must have already taken up all the heat they can without surpassing the maximum chosen, and the contents of the vat have become more thoroughly mixed so that our test of the sugar-contents is more likely to properly represent the whole vat.

The following table shews some examples of the results we would get by making these calculations:

TABLE VIII.

S=Sugar.	T=Temperature of Must.	C=Cooling Necessary for a Maximum (M) of—		
		90°	93°	96°
24%	70°	8°	5°	2°
24	80	18	15	12
22	60	0	0	0
22	70	6	3	0
22	80	16	13	10

This represents such calculations as might be made as soon as the vats are filled. If we wait until the maximum temperature is reached we would get such results as the following:

TABLE IX.

S=Sugar.	T=Temperature of Must.	C=Cooling Necessary for a Maximum (M) of—		
		90°	93°	96°
10%	90°	12°	9°	6°
10	93	..	12	9
10	95	..	..	11
6	90	7	4	1
6	93	..	7	4
6	95	..	..	5

It is highly desirable that we postpone the use of the cooler until the vat has very nearly reached the maximum temperature desired, for it is only in this way that we can obtain the maximum efficiency for our machine.

When we have thus found C*, the number of degrees which the whole contents of the vat must be lowered, we can easily determine how much the cooler should be used. If 10,000 gallons are to be cooled 5 degrees, it does not matter whether we pass 10,000 gallons through the cooler taking 5° F. from every gallon passed, or whether we simply pass 5,000 gallons taking 10° F. If the contents of the vat are thoroughly mixed, as they will be during the operation, the final effect will be the same, namely, the reduction of the temperature of the whole 5° F.

For every machine there will be a certain rate of pumping and a certain amount of lowering of the temperature corresponding to the greatest efficiency of the machine. This rate and this degree of cooling must be determined for each machine, and will depend principally on the size of the machine and the temperature of the water. In the machine used at Fresno, they were 1,000 gallons per hour and a reduction of 15° F. To determine the time, therefore, during which we must use the cooler on a certain vat, we first determine C as above and then make use of the following formula:

$$H = \frac{G \times C}{R \times F}$$

Where

H = The number of hours the cooler must be used.
G = The number of gallons of grapes in the vat.
C = The number of degrees F. which the whole vat must be lowered.
R = The number of gallons per hour passed through the cooler.
F = The number of degrees lost by the wine passing through the cooler.

For example, let

$$G \; 2500; \; C \; 10, \; R \; 1000; \; F \; 15$$

Then,

$$H \; \frac{2500 \times 10}{1000 \times 15} = 1{\cdot}67, \text{ or 1 hour 40 minutes.}$$

In order to use the cooler effectively, it is necessary to watch closely the rise of temperature and disappearance of sugar, as is done in every well-conducted cellar. These observations should be made at least twice a day, and oftener when the temperature approaches the critical point. From these observations some such table as those shewn below should be constructed. This will enable us to start the cooling at the right moment, and in a few seconds to calculate the amount of cooling necessary.

---

*C can be found without calculation by referring to Tables XIII and XIV at the end of this bulletin.

TABLE X.

Examples of Control of Temperature with Cooler.

I. Vats 1,000—3,000 gallons. Moderate weather. Quick fermentation. Heat radiated, one-half of that generated by fermentation.

	Sugar.	Sugar Lost.	Heat Generated.	Heat Lost by Radiation, etc.	Temperature of Vat.	Degrees Removed from Vat.
At crushing ..	24%B.				80°F.	
		2%B	7·02°F.	3·02°F.		
At 1 day ..	21				81	
		6	14·04	7·04		
At 2 days ..	15				91	
		3	7·02	4·02		
At 2½ days ..	12				94	13°F.
		7	16·38	8·38	(81	
At 3 days ..	5				80	
		5	11·70	5·70		
At 4 days ..	0				95	

II. Vats 1,000-3,000 gallons. Moderate weather. Slower fermentation Heat lost, one half.

	Sugar.	Sugar Lost.	Heat Generated.	Heat Lost by Radiation, etc.	Temperature of Vat.	Degrees Removed from Vat.
At crushing ..	24%B.				70°F.	
		2%B.	4·68°F.	1·68°F.		
At 1 day ..	22				73	
		5	11·70	5·70		
At 2 days ..	17				79	
		9	21·06	11·06		
At 3 days ..	8				89	8°F.
		6	14·04	7·04	(81)	
At 4 days ..	2				88	
		2	4·68	2·68		
At 5 days ..	0				90	

III. Vats 5,000-10,000 gallons. Or warm weather. Heat lost, one third.

	Sugar.	Sugar Lost.	Heat Generated.	Heat Lost by Radiation, etc.	Temperature of Vat.	Degrees Removed from Vat.
At crushing ..	24%B.				80°F.	
		3%B.	7·02°F.	2·02°F.		
At 1 day ..	21				85	
		6	14·04	4·04		
At 2 days ..	15				95	
		10	23·40	8·40	(80)	15°F.
At 3 days ..	5				95	
		5	11·70	3·70	(87)	8°F.
At 4 days ..	0				95	

Example I. represents a fermentation of grapes containing 24 per cent. of sugar which were crushed warm (80° F.), and of which the maximum temperature attained during fermentation was 95° F. The cooling necessary for 2,500 gallons of fermenting grapes, with our machine, is found by using the formula given on page 34:

$$H = \frac{2500 \times 13}{1000 \times 15} = 2{\cdot}17, \text{ or 2 hours 10 minutes.}$$

In example II. the grapes were cooler when crushed and the temperature was not allowed to exceed 90° F. The cooler was used as follows:

$$H = \frac{2500 \times 8}{1000 \times 15} = 1 \cdot 34\text{, or 1 hour 20 minutes.}$$

In example III. it is supposed that on account of hot weather and large vats the loss by radiation was only one third of the heat generated by fermentation. In this case, C, the number of degrees which it is necessary to lower the whole vat, is found by modifying the formula on pages 32-3:

$$C = 1 \cdot 56\ S + T - M.$$

In this case, if we are dealing with a vat containing 9,000 gallons of crushed grapes, the time our cooler would have to be used is as follows:

$$H = \frac{9000 \times 23}{1000 \times 15} = 13 \cdot 8\text{, or 13 hours 50 minutes;}$$

or, as represented in the table, one cooling of 9 hours one day and another of

$$H = \frac{9000 \times 8}{1000 \times 15} = 4 \cdot 8\text{, or 4 hours 50 minutes}$$

the next.

It is not necessary that the temperature of the vat after cooling should be as low as is indicated by the figures in parentheses in the last column but one of Table X. These figures simply represent the temperature which would be necessary if the cooling were instantaneous. As the cooling takes time, heat is being generated by the fermentation at the same time that the cooler is removing heat. The final temperature of the vat, therefore, after the cooling will be higher than that represented by the figures in parentheses. The difference will be very slight in the case of small vats, which are cooled quickly, but considerable in the case of large vats. In a 10,000-gallon vat, under the conditions represented in example III., during the first cooling of 9 hours, 15° F. would be removed by the cooler, but at the same time about 4° F. would be added by fermentation, so that when the cooling was finished the temperature of the vat would not be 80° F., but 84° F.

This does not mean that the cooling has not been so effective as the calculation indicated. The production of heat has been accompanied by a diminution of sugar, and the possibility of a rise of temperature is so far diminished. The effective cooling, therefore, has been 15° F., as shewn by calculation. This shews the need of making these calculations, for it is impossible to tell simply by testing the temperature of the vat when sufficient cooling has been effected.

COOLING WHITE WINE.

It is much more rare to find white wines failing to ferment out dry than red. The reason for this is that they much more rarely attain high temperatures during fermentation. There are several causes for this. In the first place the absence of a cap of pomace permits the heat to radiate off more freely; and in the second place, white wines are usually fermented in smaller casks or vats, which is also an aid to heat radiation; and finally, white musts are usually sulphured, which makes the fermentation slower, and this gives the heat generated more time to escape.

This is well shewn by the record of two fermentations in puncheons of white wine made this year in Fresno:

TABLE XI.

Loss of Heat by Radiation in Puncheons of Fermenting White Wine.

	Sugar.	Temperature Observed.	Heat Generated.	Loss by Radiation.
Experiment VI.				
At crushing	22·5%B.	78° F.		
At 1 day	16 7	85	13·5° F.	48%,
At 2 days	9·1	88	17·8	84
At 3 days	4·7	88	10·3	100
At 4 days	2·8	88	4·5	100
At 5 days	2·0	87	2.0	150
Total loss of heat by radiation	..	..	..	81%.
Experiment VIa.				
At crushing	25·0% B.	78° F.		
At 1 day	17·0	88	18·5° F.	40%,
At 2 days	8·7	92	19·5	80
At 3 days	5 9	89	6·5	146
At 4 days	4·4	87	3·5	157
Total loss of heat by radiation	..	..	..	80%,

In the first of these cases enough of the heat generated by the fermentation of 20·5% B. of sugar was lost by radiation to prevent the temperature of the wine rising above 88° F.

In the second case, the fermentation started more rapidly during the first day, and although the total heat lost during four days was practically the same as in the first case, there was more generated the first day, which shews itself in the rise to 88° F. instead of to 85° F., as in the first case. This rapid start caused the maximum temperature to be 3 degrees higher, *e.g.* 92° F.

This exemplifies the danger of starting the fermentation too rapidly by adding too large a quantity of yeast or starter.

When the maximum temperature is reached, as much or more heat is lost by radiation as is generated by fermentation. In a properly conducted fermentation of red wine this does not usually occur until the wine is nearly dry. With white wine in small casks, owing to the much greater loss of heat, this usually occurs when the wine still contains 4 or 5 per cent. of sugar. In cold seasons and localities the fall of temperature may be so rapid as to check the fermentation.

While a cooling machine is rarely needed for white wines when fermented in small casks, it is quite otherwise when the fermentation takes place in large casks or vats. This is exemplified by the record of a 1,600-gallon cask of Burger made at Fresno this year.

TABLE XII.

Loss of Heat by Radiation and Cooling in a 1,600-gallon Cask of Fermenting White Wine.

Experiment VIII.	Sugar.	Temperature. Observed.	Heat Generated	Heat Lost by Radiation.
At crushing	21·5% B.	80° F.		
At 1 day	7·0	90	31·0° F.	70 %
		Cooled to 80° F.		
At 2 days	2·1	86	11·5	18 %
At 3 days	1·0	89	2·5	

Heat lost by radiation	60%
Heat lost by cooling	21%
Total	81%

In this case the heat lost by radiation, 60 per cent., is little more than in the red wine fermentation. If the wine had not been cooled when it reached 90° F., it would have risen to 95° or 96° F. The heat lost by radiation and removed by cooling in the 1,600-gallon cask were, together, capable of keeping the maximum only as low as it was kept in the 180-gallon puncheons by radiation alone.

TABLE XIII.

Shewing C. the Number of Degrees F to Cool the Must or Fermenting Wine to Prevent the Temperature Rising Above 90° F

For vats not exceeding 3,000 gallons and cellars not hotter than 80° F. C = 1 17 S + T — M.

= TEMPERATURE

S = SUGAR

	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
30	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
29	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
28	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
27	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
26	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
25	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
24	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
23	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
22	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
21	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
20	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
19	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
18	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
17	..	..	..	..	..	..	..	..	..	..	.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
16	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
15	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
12	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13	14
11	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12	13
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11	12
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9	10	11
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8	9
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7	8
6	..	..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6	7
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	4	5	6
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.	..		1	2	3	4	5
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	.		1	2	3	4
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..		..	..	1
0	..	..	..	..	.	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	..	..	..	.	.	..	..	..	..

TABLE XIV.

She ing the Number of Degree to Cool the Must or Fermenting Wine e Temperature Rising Abo ° F.

For vats exceeding 5, gallons and cellars hotter than 80° F. C = 1·56 S + T — M.

T = TEMPERATURE.

S = SUGAR										80			84	85	86	87	88	89	90	91	92	93	94	M = 95
				25	26	2		29	3	3	33	3	36	37	38	39	40	41	42	43	44	45	46	47
	7	18	9	23	24	2		27	2	3	31	3	34	35	36	37	38	39	40	41	42	43	44	45
	5	16	7	22	23	2		26	2	2	30	3	33	34	35	36	37	38	39	40	41	42	43	44
	4	15	6	20	21	22	2	24	2	2	28	2	31	32	33	34	35	36	37	38	39	40	41	42
27	2	13	4	19	20	21	2	23	2	2	27	2	30	31	32	33	34	35	36	37	38	39	40	41
26	1	12	3	17	18	19	2	21	2	2	25	2	28	29	30	31	32	33	34	35	36	37	38	39
25	9	10	1	15	16	17	1	19			23	2	26	27	28	29	30	31	32	33	34	35	36	37
24	7	8	9	13	14	15	1	17			21	2	24	25	26	27	28	29	30	31	32	33	34	35
23	5	6	7	12	13	14	1	16			20	2	23	24	25	26	27	28	29	30	31	32	33	34
22	4	5	6	11	12	13	1	15			19	2	22	23	24	25	26	27	28	29	30	31	32	33
21	3	4	5	9	10	11	1	13			17	1	20	21	22	23	24	25	26	27	28	29	30	31
20	1	2	3	8	9	10	1	12			16	1	19	20	21	22	23	24	25	26	27	28	29	30
19	,	1	2	6	7			10			14	1	17	18	19	20	21	22	23	24	25	26	27	28
18				5	6			9			13	1	16	17	18	19	20	21	22	23	24	25	26	27
17				3	4			7			11	1	14	15	16	17	18	19	2	21	22	23	24	25
16				1	2			5			9	1	12	13	14	15	16	17	18	19	20	21	22	23
15								4			8		11	12	13	14	15	16	17	18	19	20	21	22
14								2			6		9	10	11	12	13	14	15	16	17	18	19	20
13								1			5		8	9	10	11	12	13	14	15	16	17	18	19
12											3		6	7	8	9	10	11	12	13	14	15	16	17
11													5	6	7	8	9	10	11	12	13	14	15	16
10													3	4	5	6	7	8	9	10	11	12	13	14
9													2	3	4	5	6	7	8	9	10	11	12	13
8													..	1	2	3	4	5	6	7	8	9	10	11
7													..	..	..	1	2	3	4	5	6	7	8	9
6													..	..	..	..	1	2	3	4	5	6	7	8
5													..	..	..	..	..	..	1	2	3	4	5	6
4													..		..	..	..	..		1	2	3	4	5
3													..	..	..	..	..	..	..	..	..	1	2	3
2													..	..	.	..	..	..	..	..	..	..	1	2
1													..	..	..		.	..	..	..	..	..	..	.
0																								

Notes on the Use of Tables XIII. and XIV.—To use these tables we must first determine the temperature and degrees Balling of the must in the vat. Then by following the horizontal line opposite the number representing the degrees Balling until it intersects the vertical line running from the number representing the temperature we find a number which shews the number of degrees F. which the contents of the vat must be lowered. This number we call C. Then by using the formula given on page 34 we find how long the cooler should be used in the vat. This formula and one of the above tables are all that are necessary for the effective and economical working of the machine. For example:

Grapes at 20 per cent. Bal. if crushed at 64° F. will not rise above 90° F., and therefore need no cooling. Grapes with the same amount of sugar but crushed at 79° F. must be cooled 12° F. when they reach 90° F., or before, or they will reach a temperature of over 100° F. By referring to the 90° column we find the number 12 in the row representing 10 per cent. of sugar. This shews that the fermenting must will reach 90° F. when it still has 10 per cent. of sugar, and as indicated in that line requires to be cooled 12° F., as already determined.

This shews that we can tell the amount of cooling necessary from the temperature and sugar tests at any time, either when the grapes are first crushed or when they are fermenting. The later the determination is made the less liable to error it will be. Any calculation made before fermentation will be only approximate, but made when the temperature is near the maximum it will be quite exact enough.

CITRUS FAILURES IN ALBANY AND BATHURST.

Report by C. P. Lounsbury, Government Entomologist.

Some months back, Mr. S. Geo. Amm, of Lindale, Salem, wrote the *Agricultural Journal*, calling attention to the serious losses inflicted on citrus growers in the Albany and Bathurst districts owing to many and continuous failures among the grafted trees, attributable, he thought, to disease. Nothing, he reported, seemed to check the ravages of this new affliction, and month by month the sorrowful tale was told of trees dying, and the affection appearing at farms many miles apart. The strange part of the story is that seedling trees growing side by side with the grafted varieties are not affected. The disease does not attack the collar or crown, but is entirely confined to the roots. In some cases the tree dies rapidly; the leaves wither, and in two or three weeks after first noticing that something is wrong, the tree is dead. In other cases the leaves turn yellow and fall off; the tree makes an effort to revive, sometimes dragging out an existence for a year or more before it succumbs.

Some correspondence ensued on this, and ultimately the matter was submitted to the Director of Agriculture, who, seeing that the case called for investigation, arranged for an enquiry to be made, and the result of this is contained in the following report by Mr. C. P. Lounsbury, the Government Entomologist:

The Director of Agriculture.—

When visiting the Albany District on other Departmental business in August, I carried out your instructions to make enquiries concerning the widespread failure of citrous trees reported by Mr. S. Geo. Amm, of Salem, in letters addressed to the Department early in the present year. The young orchards of Mr. Amm, at Salem, Mr. Robert Wallace and Mr. Jno. Jolly, in Collingham Valley; Mr. L. J. Roberts, at Kroomie, and Mr G. M. Leppan, at Waterkloof, Adelaide, were visited, and I had a long conversation on the subject with Mr. C. J. Stirk, and one with his son, Mr. R. Stirk, of the well known citrous fruit farm "Woodlands."

The conditions at the places visited are doubtless representative of the conditions on many other farms in the eastern part of the Colony. Some thousands of budded or grafted citrous trees have been planted out in recent years in plots of a few dozen to several hundreds, and as time has progressed, it has become evident that something is radically wrong with the majority of them. Some have done well. Some died in a few years without having made growth. Some that have made little or no growth still linger on, though six to eight or more years in their present positions. Some have made good growth for four, five or more years, and have then died off without obvious cause. Many are now failing. Some take a long time to die, others a very short time.

No Disease Present.

While I cannot speak with absolute certainty on the point, there seems to me no reason to suspect the cause of failure to be any disease, that is any trouble of an infectious nature spreading from tree to tree in the orchard. The typical course of the trouble appears for the foliage to lose colour and to become scanty. The bare twigs die back, and gradually the tree perishes. There is no gumming, and no breaking of the bark about the trunk or collar. The roots appear to perish with the tops. They die back from the extremities, the failing tree having few root hairs. Some roots perish altogether, dying back to a junction and leaving the dead part sharply defined from the living. The bark of the dead roots strips off at a touch, and the wood beneath is generally stained black. The failure seems to be throughout the tree. Under the stimulus of rain, some failing trees are said to partially recover, but to soon relapse. Healthy trees may stand amongst dead ones, one row may die out, leaving healthy rows alongside, or one section of an orchard may quite fail whilst an adjoining part grows vigorously. The trouble appears confined to young orchards, and is now most experienced in those planted about 1898 to 1900.

A mycologist would doubtless discover a number of parasitic fungi that are at present unrecorded in the failing orchards. There is a brown "spot" in a small proportion of the fruits, most common in the naartjes. A few long white mycelia are found in the bark of some of the dead roots, and what appeared to be the spores of some other fungus were observable near the junction of sound and dead tissue on both roots and twigs brought from Mr. Amm's place. But while some fungus may hasten the breakdown, the superficial evidence inclines me to believe that it cannot be the fundamental cause.

Cultural Conditions not Responsible.

At nearly every place that one may examine failing young citrus orchards, he may be able to justly criticise the conditions in regard to one or more of the cultural factors that influence success. The site may be much exposed to wind or frost. The soil may not be well suited to citrous trees, or at least to one or more of the kinds of stocks used, it may not have been well prepared, or may have been injudiciously manured, the trees may have been set a little too deep, or cultivation or irrigation may have been neglected. But on the whole the evidence is such that one may safely conclude the main trouble to be quite apart from these considerations.

It may be mentioned that at no place visited are there large blocks of trees of one variety on one kind of stock. Most of the plantings where failures are reported are made up of a dozen or more varieties, many of which are new to the country within the last ten or twelve years, and many of the varieties are on more than one kind of stock. In these circumstances, considerable variation in the size and vigour of different trees would not be surprising, even were the cultural conditions fully favourable. For some orchards no record exists to show what varieties are planted, and commonly it is not known what trees are on one stock and what on another. The trees came from more than one nursery, and most, if not all, were planted from tins.

THE QUESTION OF STOCKS.

The most casual survey of the situation leads one to question the suitability of the stocks which carry the trees that fail, and as the general result of my superficial enquiry I believe the whole trouble centres here. It has become very generally recognized in the Colony during the last six to eight years that a great number of trees of many varieties which were worked on Bitter Seville stock were foredoomed to early failure. I phrase the matter this way because the Cape experience appears to conflict with the experience of other countries, so that it may not be the *variety* of either the stock or the scion that is at fault, but the *strain* of the variety of the stock on the scion. Now it appears that the longevity of many trees on the Pamplemousse stock, and perhaps of many of Rough Lemon stock, is questionable through the roots and tops not being suited to one another. The evidence is fairly strong against the Pamplemousse, but it is as yet very weak against the Rough Lemon. Mr. Amm, in his correspondence, gave the Rough Lemon as the stock with which most of the failures are occurring, but he based his statement only on what he thought was the experience in his own case. He says the nurseryman who supplied the trees did not specify the stocks they were on, but gave him the impression that a small part were on Seville and the rest on Lemon. Some of the trees are now almost as small as when they were planted in 1898 or 1899, and these and many stunted ones that have died are assumed to be those on Seville. Other of the trees have made splendid growth, and appear to be in perfect health, and that some of these are on Lemon is to be seen by root sprouts. None of the failing trees that I examined had any root sprouts, and the fact that the Lemon is not known to have proved a failure elsewhere leads me to suspect that they are on some other stock. One tree was dug out for me, but we could not tell the stock; the growth was not that of the Seville, however. The nurseryman has no record or recollection of what stock the trees are on, and for all he can now say, many may be on the Pamplemousse, which he had begun to use rather freely in the late nineties. I have suggested to Mr. Amm that he watch closely for root sprouts, and record the kind of each tree as he learns it, and further, that he take steps to encourage sprouts from the root of any tree that begins to fail if its stock has not become known to him.

Before trees on the Seville were demanded by growers, the Rough Lemon was commonly used as a stock, and it appears to have produced lasting trees. Mr. Amm shewed me a large and healthy Navel Orange tree that he had brought from the Botanic Gardens in Grahamstown twenty-five years ago, and which he knows to be on the Lemon; also Mr. Stirk told me that he has large Navel trees on the stock. The latter's experience with trees later planted is important. When new varieties and Bitter Seville stock were preached ten to twelve years ago, he did his utmost to obey the text. His first new plantings included the newly introduced Washington Navel on Pamplemousse. Then to get this famous variety on Seville he supplied bud-sticks from his trees to the Botanic Gardens at Grahamstown for working, and thus he got several hundreds on this then much praised stock. For several years nearly all of the new trees grew well enough, and no failure was apprehended. In 1897 the orchard missed getting first prize in the Government competition by a single point only, and in the following year it was awarded the highest number of points. But soon afterwards the trees on the Seville stock began to fail, and eventually all were taken out; some, I am told, had grown fairly well for five years, and when they failed, Mr. Stirk was inclined to think that the shallowness of the soil was the cause. Later, however, the original Washington Navels on Pamplemousse began to die in the same way, and in about eight years from the time they were planted every one had to be uprooted as useless. The older Cape Navels on Lemon and old seedling trees remain, and are said to be quite healthy.

Nurserymen make use of the Pamplemousse as a stock because it withstands the Root Rot trouble better than Sweet Orange and Rough Lemon, the stocks which were used in the Colony before the disease commanded much attention. The Government strongly recommended the Seville to get resistance to the disease, and when the Seville was found unsatisfactory in many cases the employment of the Pamplemousse was much extended. In the western part of the Colony, nurserymen almost invariably "bud" citrous stocks, but in some eastern parts, "grafting" is the more common method of propagation on account of climatic reasons. It is possibly because of the difference that some Eastern Province nurserymen have been much more successful in producing saleable trees on the Seville and

Pamplemousse than nurserymen in the western districts; and orchard failures may be now more common in the east than in the west because of this greater success in the nursery use of the stocks.

Among those who have sought to use the Pamplemousse as a stock is Mr. H. G. Flanagan, of Komgha, a grower now admitted to be the best authority on citrous matters in the east of the Colony. In a recent paper on citrous culture, Mr. Flanagan said: "The Pamplemousse I have used rather extensively as a stock, but find some varieties unsuited to it, and the result not always uniform even in the same variety. In future, it will be discarded for my own planting." The seeds from which Mr. Flanagan raised his Pamplemousse stocks were some he got himself from fruits off known trees in the Victoria East District, so the lack of uniformity in results cannot be attributed to the seeds not being true to name. The seed which has been used by some nurserymen was obtained from a certain jam factory, so one might not unreasonably suspect a slight admixture of other kinds; but on enquiry of the management of the factory, I was told that the seed supplied has all come from Pamplemousse fruits. The orchard results, as in Mr. Flanagan's case, lack uniformity. Natural variation and variations due to differences in soil between the site of one tree and another must be held in part accountable, but in some cases trees on Lemon stocks appear to have been sold for trees on Pamplemousse. How such mistakes have occurred, and how frequent they have been, cannot be answered. There seems no reason to doubt the good faith of the nurserymen concerned, nor the records of the planters; but the fact remains that some stocks which have been bought as Pamplemousse have thrown up Lemon suckers.

Without Mr. Stirk's and Mr. Flanagan's experiences there would be insufficient basis for me to openly question the success of the Pamplemousse as a stock. There is too much doubt as to the identity of the stocks at the places I visited, and only at Jolly's and Roberts's were the stocks shewn on the orchard plans. Mr. Jolly has a most carefully prepared plan, which purports to shew the stock and variety of nearly every tree, but there are many obvious errors as regards the tops and certainly an occasional one at least as regards the stocks. Nearly 600 trees were planted between 1899 and 1901. These are nearly all supposed to be on Seville and Pamplemousse, and every variety they propagated seems to have been supplied by the nurserymen. Navels figure under five names—Navel, Bahia, Sustain, Embiguo, and Washington Navel. A large number of trees have died and, disregarding the naartjes and lemons and young trees on lemon stocks, all of which seem to be doing well, under one-half are making anything like satisfactory growth, trees recorded to be on Pamplemousse failing like those on Seville. However, there are some thriving trees said to be on Seville, and the finest trees in the orchard comprise several rows of Navel on

Pamplemousse. The latter were planted in 1899, and are fully eight feet high; the place of one is occupied by a Pamplemousse, the scion having perished, and the top having grown up to form a tree and bear fruit. Mr. Roberts's orchard dates from February, 1903, only, and owing to drought and other factors which have caused failures, only the first planted trees can be considered in estimating variations due to stock influences. These number 140, and are planted in four parallel rows of equal length. All the trees came from one nursery, and all were supposed to be on Seville or Pamplemousse. In general, the stocks are thought to be named correctly, but one of each kind has overcome its scion, and proved to be Lemon. Washington Navel, Excelsior, and St. Michael on Pamplemousse, of which there are 35, 11 and 11 respectively, are on the whole satisfactory, while Old Cape, Jaffa, Dulcissima, Nonpareil, Valencia Late, Bahia, Embigua, and Sustain on the same stock, of which there are 2 to 12 each, are all unsatisfactory. Excelsior and St. Michael on Seville, of which there are 10 and 4 respectively, look fairly well, though not as good as those on Pamplemousse, but nine other varieties on the stock, represented by 1 to 10 trees each, have made poor growth, in some cases none at all.

FURTHER ENQUIRIES.

Enough has been reported to shew that I have concluded the trouble to be a problem in practical horticulture, but though the matter is therefore quite foreign to the scope of my office, I think that having been deputed to make the initial enquiries, I ought to say what further steps I think should be taken.

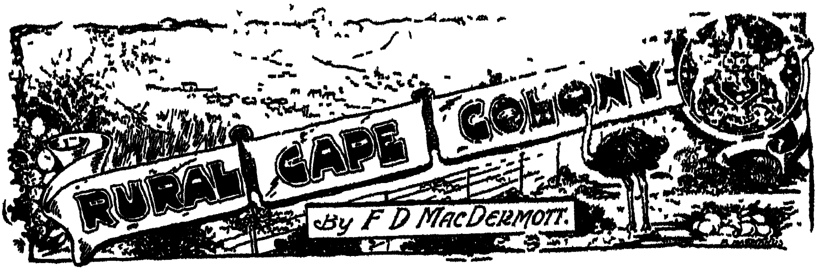
There is urgent need, in my opinion, for the Government to institute a searching enquiry into the whole question of citrous stocks. The great superiority of certain named sorts of oranges over the common seedlings has become widely recognised in many districts of the Colony, thanks largely to the labours of the Fruit Expert and of the late Botanist of the Department, but the planting of the better sorts is being seriously retarded through the failures undoubtedly due to lack of affinity between the scion and the stock that have been of such frequent occurrence in recent years. Few planters will now accept knowingly an orange tree budded on Seville stock, the position as regards the Pamplemousse is becoming the same, and a fear is felt by some that in a few years the Rough Lemon may also be found unreliable. The only way in which needless fears may be allayed, and confidence in taking the better sorts inspired in the would-be planters, is by a thorough investigation to ascertain the causes which have led to these failures. The conflicting results in the use of different stocks that have been obtained indicate that a superficial enquiry would probably fail to serve its purpose. It seems to me that consideration should be given to the history of the stock and scion of each individual tree from which any deduction may be made, and that the field enquiries should be supplemented by a determined effort to clear up all doubtful points by direct experiments. Almost needless to remark, anyone entrusted with the work should have a wide knowledge of citrous varieties in order that he may detect, as far as possible, errors in the names used by the nurserymen and the orchardists, and he should be well qualified in other respects. The enquiry contemplated would be closely comparable to the work of determining the behaviour of the different grape varieties on various American stocks—work which the Department last year entrusted to a committee. But there would be important advantages in having the citrous stock work assigned to an officer in the Government service. Close attention might have to be given to the subject for a number of years. Naturally, the supervision of the tests of stocks now being conducted for the Department by Mr. Cillie, of Wellington, and Mr. Flanagan, of Komgha, would fall upon whoever took up the enquiry; these tests were begun by Mr. Bioletti, late of Elsenburg, with the view of throwing light on the causes of failure with the Seville stock, and were taken over by Mr. Cillie and Mr. Flanagan when Mr. Bioletti resigned from the service to take up a post in America.

The circumstances in which the Department is at present situated as regards funds lead me to anticipate the decision that it is at present quite impracticable to give effect to the above suggestion. Therefore, I wish to remark that if the work cannot now be taken up with the intention of doing it well, and a reasonable prospect of carrying it on as long as the objects appear to justify the expenditure necessary, I think that its initiation should be postponed until better times. And delay is regrettable, but there is some consolation in the facts that no amount of enquiry will save trees planted on unsuitable roots, and that there has been such a general return to the Rough Lemon stock on the part of nurserymen that future plantings are likely to be nearly all on this apparently reliable stock until a better one is decisively proved. Meanwhile, it is desirable that owners of citrous orchards where trees fail, or lack vigour from what may be a lack of harmony between the tops and the stocks, should ascertain what stock each of their trees is on by the observation of suckers, which start from below the bud union. They should certainly inform the nurserymen from whom they procured the trees in regard to all failures, and the Department should be informed in cases where the stock is known to be other than the Seville. I also think it advisable that the Department keep in touch with the progress of the trouble by having enquiries made each year at the principal farms where failures are known to be occurring, as at Mr. Jolly's and Mr. Amm's. It is probable that visits to some places can be arranged in connection with other work, and when visits are inconvenient, enquiries by post might be made.

In closing this memorandum, I wish to allude to the "Masters

Training System,'' which is a method of propagating citrous trees practised for the last few years by Mr. W. E. Masters, of Coombs Forest, Bathurst. Mr. Masters claims to have made a discovery quite by accident of what may be termed a principle in plant breeding; and, if well founded, this discovery explains all the perplexing and variable results the people of this Colony have had in the use of Bitter Seville and Pamplemousse stocks. According to the idea, the Cape nurserymen more or less violate a principle which, in the propagation of citrous trees elsewhere, has been generally followed unconsciously; the Cape nurserymen have been in no way incompetent in their work, and to some extent it has been their enterprise that has led them into error. If Mr. Masters makes his views public, the solution of the present difficulties with stocks may be comparatively easy; and in case the searching enquiry into the failures of stocks above suggested is carried out, careful tests to demonstrate the worth of the ''System'' will naturally be included among the experiments.

[The work of Mr. Masters is now in our hands, and publication will be commenced in the *Agricultural Journal* so soon as the illustrations can be prepared.—Ed., *A.J.*]



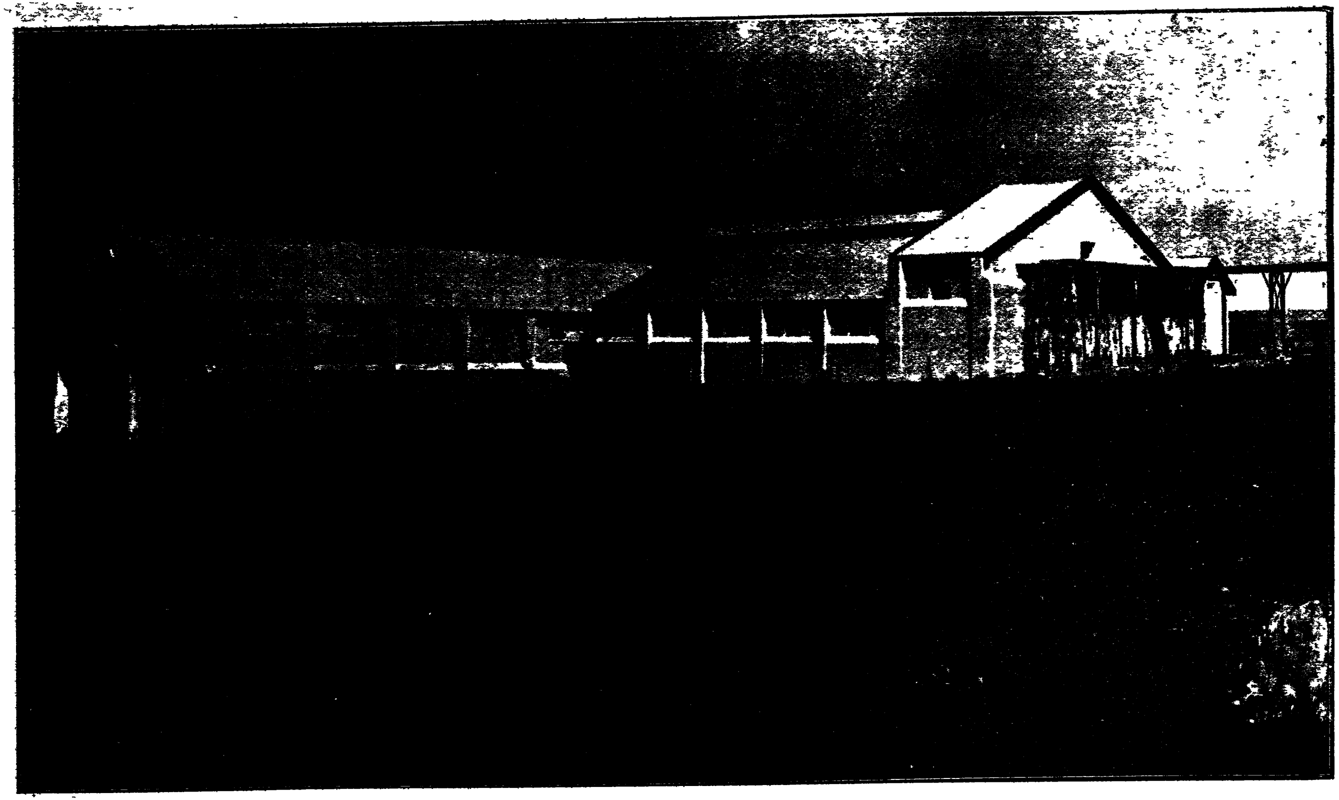
No. XXIII.

CO-OPERATION AT WELLINGTON.

Wellington has long been noted for its productiveness, and of recent years the advances made in the cultural industries of that section have been many and rapid. In every branch of agriculture the same set of conditions seems to prevail, for progress is reported on every side. So great has been the advance in viticulture and dairying that it was found practicable last year to formulate schemes for the establishment of both a co-operative creamery and a co-operative winery, and these institutions are now in full working order, much to the satisfaction of their promoters.

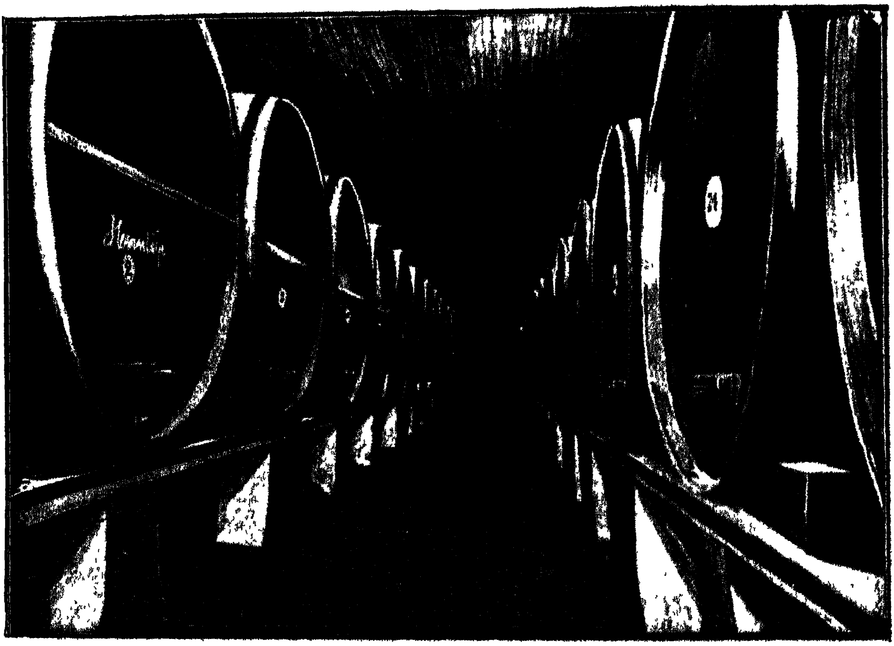
The Co-operative Winery.

The Winery, which has not long been completed, promises to fill a void in the viticultural progress of the district, and with the rapid expansion of the vineyards which has marked the development of the industry hereabouts during the past few years should soon be in a position to add materially to the output of the Colony. The company was formed at the instance of Mr. L. Abrahamson, M.L.A., who is deeply interested in viticulture, having a very large area of his fine farm laid down to vines. The scheme was taken up with interest by others in the neighbourhood, and with the assistance of the Government, under the general co-operative scheme, the concern soon became an accomplished fact. It is now open and in full working order, as will be seen by the illustrations herewith. The buildings were brought far enough forward to enable the company to handle the last vintage with a fair amount of success, and though there were several of the usual troubles encountered at the offset of such a venture, the company so far has not had much to complain of. The



Exterior of Wellington Co-operative Winery.

substantial nature of the buildings and the excellence of the equipment in the shape of machinery and appliances for dealing with very large quantities of grapes make the future of this institution most promising. Last vintage some 400 tons of grapes were handled successfully, and at least 600 tons are expected to be passed through during the vintage this season. But this does not limit the capacity of the winery, for it is confidently anticipated that before long the ten vineyards associated with the venture will be sending in at least a thousand tons of grapes per annum. To meet this possible expansion, further extensions will be necessary, and for this purpose it is proposed to add another wing to the buildings, and thus increase the cellarage. The cellars now will hold about 600 leaguers, and with the extensions proposed their capacity will be increased to accommodate a thousand leaguers. So far the shareholders are quite satisfied with the venture, but its full benefits will not be felt until its full working capacity has been reached, as then the proportion of working costs per unit will, of course, be considerably reduced.



Part of Cellar, Wellington Co-operative Winery.

The winery is planned and constructed on much the same principles as the new cellar at Groot Constantia. The fermenting house, fitted with cement tanks, is situated at a higher level than the cellar itself, and the grapes are brought in at the upper end of that building. Here they are weighed as delivered, and passed through the crushers. On the one side is the stemmer for red grapes, and on the other the drainer for white grapes. From these crushers the must finds its way by gravitation through chute and hose to the cement tanks, where fermentation takes place. When completed the wine is pumped to the lower or storing cellar, where it is submitted to the various operations required to bring it to maturity. In the fermenting house can be seen the must cooler and an automatic press, both indispensable machines in modern wine cellars. All the machinery, as well as the casks were imported from France, through Mr. E. Dubois, who also designed the plant, and directed the first vintage, whilst the roof and oil engines were specially imported from England by Messrs. Findlay and Co. The cement tanks were built by Messrs. Lewis and Wilkinson, who erected those at Groot Constantia. In a place like Wellington, where the temperature during the vintage is frequently exceedingly high, the question of cooling the must is one that calls for careful attention, and every precaution is being taken to cope with this difficulty as far as possible. It is hoped by the use of cooling machines, and, if found necessary, ice, which can be obtained from the Co-operative Creamery, almost alongside, to overcome any difficulties which may present themselves.

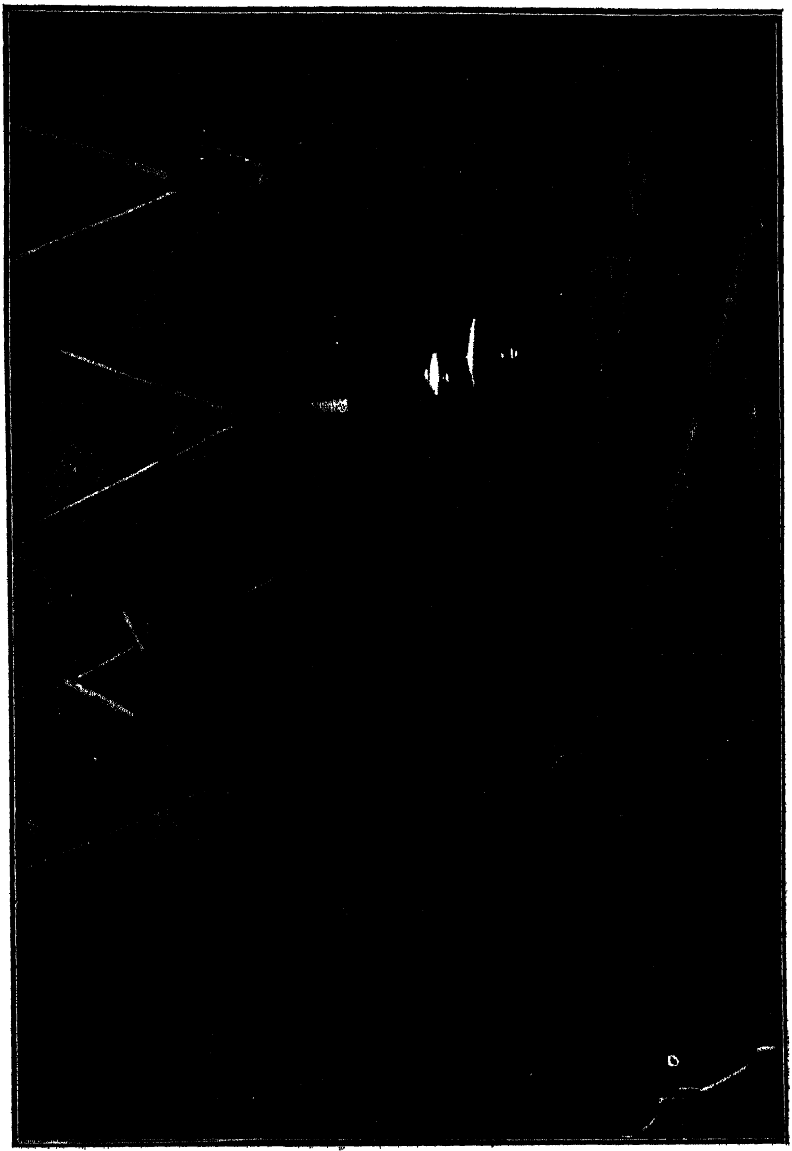
The value of co-operation in wine-making has never been seriously doubted, and its many advantages need not be referred to at any length here. But as shewing how soon the benefits can be realised, we have only to quote from the statement made by Mr. L. Abrahamson at the recent meeting of the company, when he said: "Notwithstanding the many drawbacks, consequent on the unfinished state of the cellar, the non-arrival of important parts of the machinery and the terrible heat we had during part of the vintage, we have every reason to be satisfied with the result of our first year's working, and we can look forward with confidence to doing better next year. We have had our wine tested by the best experts, and have had satisfactory reports, and we have since sold our output to a leading firm of wine merchants, who write to us as follows: 'We are very pleased to have bought your wine, some of which is very good indeed, and will probably be improved on next year.' The statements before you shew the sums received and expended to date. You will observe that after paying shareholders £4 10s. per leaguer for their grapes, paying the heavy preliminary charges before and during the vintage, and providing for payment of interest on Government loan, we are able in addition to carry forward a balance of several hundred pounds profit to next year. I would just mention that the money borrowed from Government has been exclusively used in payment for buildings and fustage, whereas the amount used for purchase of grapes and for expenses comes out of the subscribed capital of the shareholders. Now, as to our future, which is, of course, bound up in the future of the Colonial wine industry, I might say that the very existence of the Paarl district and the districts immediately adjoining, depends entirely on the wine industry. If there is a demand for the product, and a reasonable price paid for wine, its production could be increased enormously, and even a poor man could make a decent living from a 15 or 20 acre patch of vineyard."

The possibilities in viticulture, with the assistance of central wineries, are almost limitless, and would enable the small farmers of those districts where the vine flourishes to establish and maintain an industry that would keep a very large population profitably employed on small allotments. But that is some way off yet, although the advantages of the system are being rapidly appreciated and assimilated.

The winery is situated within a stone's throw of the Wellington railway station, so there can be no trouble as to distribution once the work is in full swing. While looking over the place with Mr. L. Abrahamson, his son Mr. H. Abrahamson, and the manager, the conversation naturally turned on the future of the wine industry in this Colony, and among other questions raised was that of distribution. The opinion was then voiced by Mr. L. Abrahamson that it is not the intention of this company to attempt its own distribution, if it can possibly be avoided, for it is held that the legitimate work of the merchant should not be interfered with. It is felt that the company will have quite enough to do in following along the natural lines of its own development without stepping into a field with which they are not acquainted. The co-operators intend to do their level best to turn out a sound, light, dry wine, that should be readily marketable in South Africa, and trust to the mercantile community to see to the distribution. There is no reason why South Africa should not consume its own wines in the future if the public taste can be educated to that extent, and regular supplies of even quality be placed on the markets. And to create so desirable a state of things it is believed that all the energies of the growers, the makers and the merchants will be needed, each in his own sphere, to bring about the desired conclusion. The Wellington Winery is in its infancy, and has yet to make its name, but there is little reason to suppose that it will not soon become a factor to be reckoned with if the management continues along the sound lines which have marked its progress hitherto. There are plenty of grapes in that part of the Paarl district, and much more land which could be laid down to vines, so there is no fear of the supply of material falling off. All that is needed is continuous and concentrated effort, and success should be attained.

THE WELLINGTON CO-OPERATIVE CREAMERY.

Being on the spot, it was impossible to leave without having a look over the Co-operative Creamery, which has been erected close by, and which is now turning out regular supplies of good butter, in addition to the bye-products. Like the winery, it is the outcome of the co-operative movement set afoot by the assistance of the

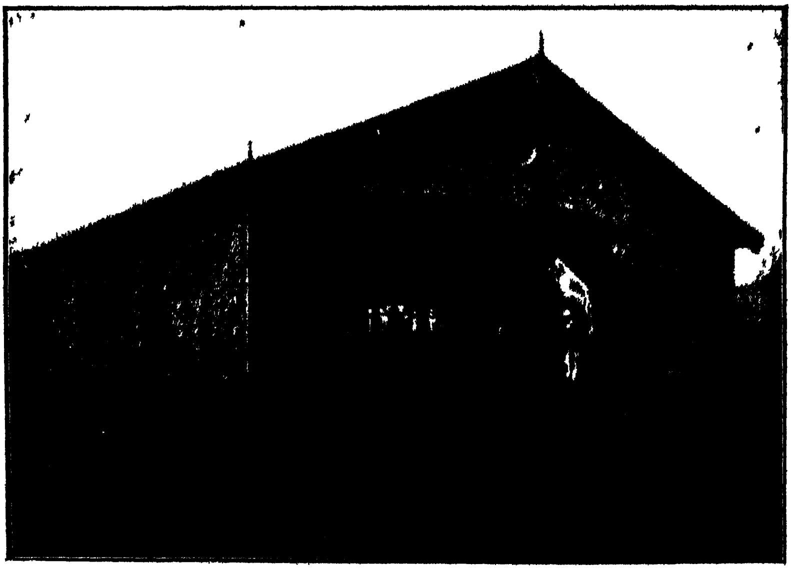


Fermenting House, Wellington Co-operative Winery.

Government, and also looks a very promising venture. The buildings are substantially constructed of brick under iron roofs, and occupy, with the manager's house, a quite respectable slice of ground. In this

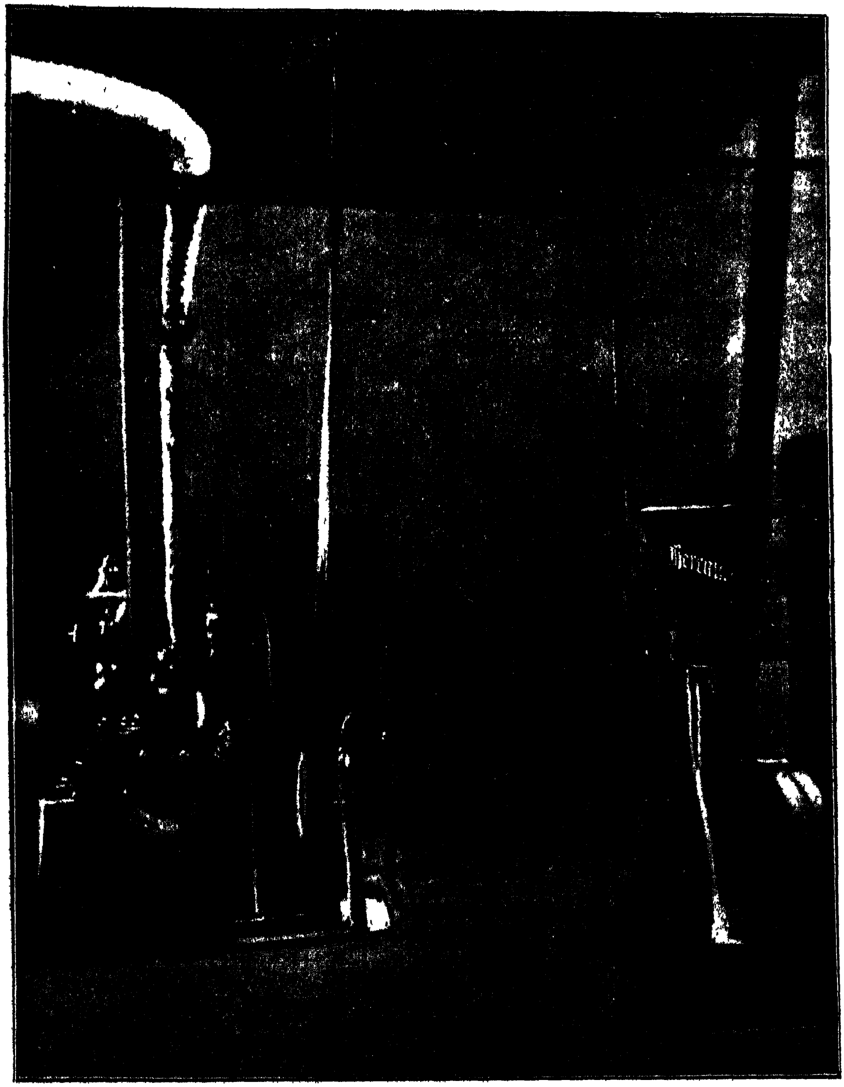
The Homestead of Mr. L. Abrahamson, M L.A , at Wellington.

also the moving spirit seems to have been Mr. L. Abrahamson, M L.A., and his sons, who worked their neighbours up to the necessary pitch of enthusiasm, until they decided to try and make something out of



Exterior Wellington Co-operative Creamery.

their milk stock by means of the liberal terms of assistance held out by the Government to such ventures. There are something like sixty farmers interested in this concern, and between them they represent about a thousand head of milking stock, and so far, although the concern is quite young, they have managed to do very well indeed.



Engine Room Wellington Co-operative Creamery.

A leading line in the policy of the management is that of quality, and it is to be hoped that this will be maintained. In no article of produce is it so essential to create a high standard and scrupulously maintain it as in that of dairying. This will come home with added force to the dairymen of this Colony as the co-operative movement spreads, for with the increasing competition it will bring, the demand will grow for the best, and only the best. It is gratifying to learn that the supplies of milk have steadily increased, and that though the output has grown accordingly, there is still a difficulty in meeting the demand for the finished article. Thus it is only necessary to carry more dairy stock to assure complete success for the farmers, and thus fill the market that is evidently there. To do this, of course, many considerations will have to be seriously pondered by the farmers, but there can be little doubt that as the payability of the industry is forced home they will not hesitate to devote their energies in the right direction, and take up such questions as those of feeding, breeding and selection, with intelligence and care in order to fill all demands that may be made upon them. There is still plenty of scope in our markets for first-class dairy produce, and those interested in that industry need have no hesitation in expanding their efforts while a pound of butter or cheese figures on the import returns.

Interior View, Wellington Co-operative Creamery.

The dairy is planned to handle either milk or cream, but the bulk brought in is milk, the farmers taking back the residues for use after the cream has been separated out. The views of the machinery rooms, churns, workers, etc., herewith speak for themselves, and call for no special description. The power is provided by a Crossley oil motor, the freezing plant consisting of a Hercules machine. The water supply is plentiful and good, and there are other natural advantages about the site which recommend it. The receiving platform opens on to a good road, and from here the milk is taken direct from the carts and handled with the utmost facility until the finished article is produced. Among those contributing milk are several small farmers, who are keen on making every possible use of all the bye-products, which are largely used for pig feeding, the latter class of stock doing well here.

As the popularity of the industry advances the present buildings will have to be enlarged, but up to the present they are quite large enough to meet all requirements. The only problem for the future seems that of the milk supply, and in this connection it is pleasing to be able to note that praiseworthy steps are being taken by the Messrs. Abrahamson to establish permanent pastures of the highest quality for feeding milk stock in order to overcome at least one portion of the difficulty.

Interior, Wellington Co-operative Creamery.

Paddocks of Paspalum.

Struck by the favourable reports received from time to time with regard to the success which has attended the efforts of the Australian dairymen in establishing *Paspalum dilatatum*, the Messrs.

Abrahamson have laid down extensive paddocks with this succulent grass, and I am pleased to be able to state that it is promising to do well. At first the success of the experiment was for some time in doubt, but quite recently the grass seems to be taking root strongly, and will no doubt soon spread itself, as it has done everywhere else, until the natural pasturage will be greatly improved. In the hot summer months the grazing gets very poor in this section, in common with most of the western districts, but if *paspalum* can be established it is hoped to get over a portion of this difficulty, and where water can be led on secure a stand of green feed for the most trying parts of the year as well as provide additional feed of a better quality for the seasons when the grazing is usually favourable. This experiment should be watched with the keenest interest by all the cattle men of the district, for the establishment of *paspalum* makes a vast difference to the prospects of successful dairying. With central creameries and *paspalum* for feed, it would only be necessary to introduce a better class of milking stock to the district to repeat the wonderful success which has attended the dairy industry in Australia in similar conditions. It does not seem to be generally recognised that the two factors which have most contributed to the success of dairying in Australia have been the cultivation of *paspalum* and the care put into the selection and breeding of the dairy stock.

WESTERN PROVINCE HORTICULTURAL BOARD.

Quarterly Meeting.

The quarterly meeting of the Western Province Horticultural Board was held on Friday, December 7th, when there were present: The Hon. C. W. H. Kohler (chairman), presiding, and Messrs. H. Cloete, M.L.A., L. Cloete, D. de Vos Rabie, M.L.A., W. H. Lategan, P. R. Malleson, W. van der Byl, P. L. le Roux, T. Micklem, C. P. Lounsbury, Government Entomologist, and the Secretary, Mr. A. A. Persse.

REPRESENTATION.

A communication was received from the Stellenbosch Agricultural Society stating that as their membership was 160, and included all the farmers in the district, they wished to be affiliated with the Board.

The Chairman explained that Stellenbosch was already represented on the Board through the Fruit-Growers' Association. Cape Town, Worcester, and Tulbagh were represented through their agricultural societies, as there were no fruit-growers' associations. Now the question arose, would the Board be justified in allowing one place to be represented by two associations.

Mr. Rabie moved that each district be represented by two representatives, no matter what society they came from.

Mr. H. Cloete said he took it that Mr. Rabie's proposition was not retrospective, because if it was he would not support it.

The Chairman said that Cape Town, although having no Fruit Growers' Association, was represented by two members.

Mr. Malleson mentioned that it was not Cape Town only, but the whole of the Western Province that was represented by the Cape Town members.

Mr. Lounsbury said he thought that representation was according to associations, and not districts.

The Chairman suggested that the subject be adjourned until next meeting, when it could be carefully inquired into. This was agreed to.

The Wine Show.

In his report on the Wine Show of 1906, the secretary said that considering the short notice given and that several farmers had disposed of their stocks, the competition was decidedly good, the entries numbering 146. The most numerous were in classes of hock, sauterne, claret, burgundy, and for the two cups presented by Mr. Jagger for red and white wine respectively.

Mr. A. S. de Villiers, who had inspected the Paarl cellars, reported: "I visited the farms of all the remaining prize winners, and satisfied myself that they were in possession of the required quantities, bringing away with me samples . . . which Mr. Green kindly compared with the original samples, and pronounced identical. There is one point . . . for the ruling of the Board. . . . That is whether mixed 'samples' are eligible to compete By mixed samples I don't mean the product of different varieties of grape pressed together and matured in the same stukvat, but samples of entirely different wines from different stukvats mixed . . . for the purpose of the show. Under the present prize list it is possible by judiciously blending to enter the same wine for two or more classes. Even without blending, many exhibitors enter the same wines for more than one class. One exhibitor had about 32 leaguers of stein, which he admitted was of practically identical quality, though the vats might differ slightly. He entered one sample of hock, one of sauterne, and two of sherry, and gained two prizes, one for hock and one for sherry. The whole question appears to require to be carefully gone into if the wine show is to do any good. The prize list should be published before vintage takes place, for if publication be delayed until after the vintage, what possible stimulus can the show have on production or methods of manufacture?"

The Chairman inquired if the meeting intended to take any action with regard to the point brought up by the secretary?

Mr. Van der Byl thought that nothing could be done. It would take a cleverer man than they had in South Africa to solve that difficulty.

Mr. H. Cloete said he would like to raise a rather important point. Under the existing rules an exhibitor had to pay 5s. for each class. Now, many exhibitors put in three or four exhibits in each class, and it was not fair that they should only pay the same entrance fee as those who only had one exhibit.

Mr. Van der Byl drew attention to the fact that the last show was not sufficiently advertised, and he thought that steps should be taken to remedy that.

The Secretary explained that he had tried to run the show as economically as he could. There was no "gate" to be relied on, and, therefore, the entrance fees had to cover the expenses.

Mr. Cloete said that he would like to refer to the judging of these wines, but he would reserve the right to do so at some other meeting.

A lengthy discussion ensued as to the advisability of appointing a committee to make arrangements for the forthcoming show.

Mr. Lategan moved that a committee be appointed at once.

A discussion took place regarding the different classes provided at the shows. Mr. H. Cloete contended that there should be classes for original and also for blended wines.

The Secretary said that at the last show the exhibit of blended was purely a sample exhibit.

Mr. Lategan explained that these shows were held for the purpose of educating the farmers, but the way things were now carried out was not educative.

Mr. L. Cloete said that it was only by blending the wines and ascertaining what was required that the farmers would be educated.

It was mentioned that many farmers only blended a certain quantity of wine for the shows, because they could not get a market for it.

The Chairman mentioned that if prizes were to be given for mixed wines, then there should be a stipulation that they had been mixed in bulk.

Mr. Lategan moved that in future prizes would only be given for varieties of grapes, and not for types of wine.

This motion was lost, and it was decided to give prizes for both types of wine and varieties of grapes.

The further consideration of the prize list was left in the hands of the committee.

THE ORGANIZATION OF AGRICULTURE.

The Hon. C. W. H. Kohler, in accordance with the directions of the Board, submitted the following memorandum on the proposal to amalgamate the Board with the Agricultural Union and the Farmers' Congress:—

Gentlemen,—The Board of Horticulture having requested the acting chairman to submit a scheme for the working together of the various agricultural societies, farmers' associations, and fruit and wine growers' associations, I have the honour to submit for your favourable consideration the following scheme, not necessarily arbitrary, but some of the points of which may, after discussion, lead to the formulation of a basis that may eventuate in a mutual understanding.

It is generally conceded that if some means could be found of bringing the different agricultural bodies into one harmonious whole, it would tend to obviate overlapping and waste of energy, which naturally follow when matters are taken in hand separately which are probably common to all.

The scheme suggested by the Agricultural Commission in 1904 to substitute something else in the place of the existing organisations met with no support, and was doomed to failure, for the reason that it failed to recognise the existing state of affairs, ignored the labour of years, and, in place of organisations that had at any rate done a great deal of good, sought to establish something else, which, though a success in another country, was highly problematical in this

Then came the circular issued by the Agricultural Department, which recommended union with the agricultural societies, and virtually meant the absorption of real live associations of farmers by organisations that have sprung up and still mainly exist for the purpose of promoting and holding agricultural shows, and consist to some considerable extent of townsmen. Although recognising the good work done by what are designated agricultural societies, the farmers' organisations refused to be absorbed by such bodies, feeling that the concerns of farmers are, after all, best managed by themselves.

After the last Agricultural Union Congress, an attempt was made by the Union to put forward a scheme of amalgamation, and a meeting was convened in the office and under the chairmanship of the Director of Agriculture. At this meeting it was found that there were very few points of difference between the farmers' associations and the vine and fruit growers' societies; and there would have been very little difficulty in these two bodies coming to a mutual understanding. The representatives of the Agricultural Union, however, declined to agree to the sphere of labour allotted to them. As the matters resolved upon at this Conference, which was quite of an informal nature, were by a majority vote only, and were, of course, subject to the ratification of the various bodies, and do not appear to meet with the approval of the agricultural societies, we, moreover, being averse to having any position forced upon ourselves, have naturally no desire to endeavour to force a distasteful position upon others; and so it would be well to abandon the position arrived at at this Conference, and start *de novo.*

Having tried substitution, absorption, and amalgamation, and having failed in all three, let us now see if we cannot meet the situation by an attempt at mutual co-operation. Let us begin by recognising the existing state of things, and continue to build on the foundation that many of us have been engaged upon for a number of years past, and it is more than likely that we shall be able to rear a superstructure that will stand the storms of adverse circumstances as well as adverse criticism. At the present time three annual congresses are held, viz., Agricultural Union, Central Farmers, and Fruit and Vine Growers. Each has its executive, whose duty it is to impress on the Government of the day the particular requirements of its members. Each body feels that it has certain interests of its own, which are not common to all three, and that those particular needs would suffer if relegated to a common body. That being so, a basis for mutual working might be found on the following lines.

Each association or society having not less than 50 members, each paying a fee of not less than 10s. per annum, shall have the right to send one delegate to each of the three congresses, and where there are 100 or more members each paying not less than 10s. per annum, such society or association shall have the right to send two delegates to each of the three congresses. Each society or association can then elect to be represented at all three congresses, or at any two of them, or at one only.

It would follow that each society or association would only send such delegates to each congress as would be interested in the subjects likely to be brought forward there. Thus a society or association whose members were solely interested in fruit and vine growing would not send delegates to the Farmers' Central Congress or the Agricultural Union, nor would an agricultural society whose members were only interested in holding shows be likely to find any of its members willing to waste two or three days in attending a fruit and vine growers' congress; but it is undoubtedly the case that in many of the societies and associations there are quite a number of members largely interested in all, in which case there would be no difficulty in finding delegates to attend the three congresses.

The three congresses should be convened at the same time and place, and should, on the first day, meet as one body, under the chairmanship of the Secretary for Agriculture, or one elected by themselves. There should be an agenda paper consisting of subjects sent forward by each association or society for discussion by (a) the combined congress, (b) each congress separately. There will thus be four agenda papers.

It will be the duty of the chairman, after he has duly opened the congress, to go through each subject and put it to the combined congress, whether such subject shall be considered by them, and unless at least six members representing three different societies or associations shall rise in their places as a protest, such subject shall be considered by the combined congress. This will prevent any one society or association sending up a subject for consideration by the combined congress, where the other associations or societies were desirous of only considering such subjects at their own congress. On the other hand, it would have the effect of broadening the working lines, for unless three associations objected, a matter would come under the consideration of the combined congress, even though it be placed upon the agenda paper for one congress only. The agenda paper having been thus arranged, the chairman shall adjourn the combined congress, and each of the three congresses shall then proceed to the consideration of their own agenda paper, and shall proceed exactly as heretofore. At the conclusion of their work, the combined congress shall re-assemble and shall then proceed to the consideration of such subjects as have been allotted to it.

The resolutions passed at the combined congresses would be entrusted to an executive elected by the delegates, the number of and the duties of such executive to be decided by such congress. Whether such executive will eventually develop into a Council of Agriculture, time alone will show; any attempt just now to lay down a rule or opinion would be a mistake, and might only lead to friction.

These, gentlemen, are the lines upon which harmonious co operation of the different bodies is most likely to result. It will in all probability be found, unless a subject is very clearly and obviously within the scope of the congress only, delegates will desire to bring their subjects for consideration before the combined congress, as in it there will be more scope for wider discussion, as well as more weight given to the resolutions passed. At the same time, they will not wish to introduce any matter that is unlikely to be of interest to the general body assembled, and thus there need be no fear that a substantial gain will not result from adopting the ideas set forth. The tendency will be more and more to consider matters in the combined congress, and so there will be gradually brought about that unity which appears to be so desirable, but which evidently will not be attained by any proposal that will infringe in the slightest degree upon existing rights and privileges.—I am, etc.,

CHAS. W. H. KOHLER.

The consideration of this communication was left in abeyance.

RAILWAY TRANSPORT.

Mr. Micklem said he had been instructed by the Stellenbosch Fruit Growers to bring before the Board a subject of some importance to fruit farmers in the Stellenbosch district. From April last up to the beginning of the present month a fruit train was run through Stellenbosch daily, and this enabled the farmers to send their fruit up-country, but now that the fruit season was coming on, the train was stopped, with the result that the farmers wishing to send fruit up-country had to send it to Wellington, where it had to wait for ten hours. In that way Stellenbosch was debarred from sending fruit up-country. He suggested that a deputation be appointed to wait on the Commissioner of Railways and lay the facts before him.

This was agreed to.

GOVERNMENT COMMISSIONS.

Mr. H. Cloete, in accordance with the directions of the Constantia Fruit-Growers' Association, brought forward the question of the appointment of Commissions by Government. He explained that the Government had some time ago appointed a Commission to inquire into the American stocks, and that committee had brought in a sort of interim report, but they had gone no further. The two gentlemen who had formed that Commission had left the country. Government now wanted to form another Commission, which would have to go over all the ground covered by the other Commissions. He thought it was absolutely foolish for the Government to proceed as they were doing.

Mr. Persse explained that the subject was brought up at the annual meeting of the Board, and two gentlemen were appointed on the Commission, but nothing had since been done.

Several members considered that a permanent Commission should be appointed.

Mr. H. Cloete expressed the opinion that the work could not be successful unless a permanent Commission was appointed to make inquiries each season.

It was eventually decided that the president of the Board wait on the Director of Agriculture regarding the matter.

A NEW "REMEDY."

Mr. Franz Lomas, chemist, 169, Long Street, Cape Town, wrote: "I have the honour to inform you that I have discovered a special remedy for fruit trees and also vines, if their fruit begins to rot, or if the vines and fruit trees begin to dry out. I hope to prove to you in a short time that I am able to save the trees and their fruits from being spoiled as the season is just coming." (Laughter.) Recorded.

The Wellington Fruit-Growers' Association communicated the terms of a recent unanimous resolution as follows: "Whereas sheep dips, scrub-exterminators, and other articles used exclusively for agricultural purposes are conveyed at a very low rate on the Cape Government Railways, and whereas 'copperas' is used only as a remedy for 'black rust' in vineyards, this meeting is of the opinion that 'copperas' be included in the list of articles so conveyed by the Cape Government Railways, and that . . . the co-operation of the Board of Horticulture be requested in this matter." Recorded.

The Director of Agriculture wrote concerning the above subject: "Mr. Pole-Evans . . . has arranged experiments on a large scale during the coming season with the Cape Orchard Company. An invitation to visit the Colony whenever necessary in the prosecution of these investigations has been sent to the Transvaal Plant Pathologist, and this department will be advised of the date of such visits." Recorded.—*Cape Times.*

HARVESTING COMPETITION.

The annual harvesting competition organised by the Western Province Agricultural Society was held at Darling this year on the 29th of November, on the farm Alexandersfontein, the property of Mrs. Martha Duckitt. A goodly company journeyed out from Cape Town, and a further contingent was picked up at Bellville from the direction of the Koeberg. Fortunately, the weather was beautiful, and the whole thing was a great success.

The competition was restricted to farmers, their sons, and white overseers, and three prizes, valued respectively at £10, £5, and £2 10s. each for the first three places, were given.

The competition was based on the following grounds: Skill shewn in handling the team, evenness and regularity of work, and absence of loose sheaves, for each of which points were given. Not [illegible] ur animals were allowed in a machine, and the team had to be driven, not led.

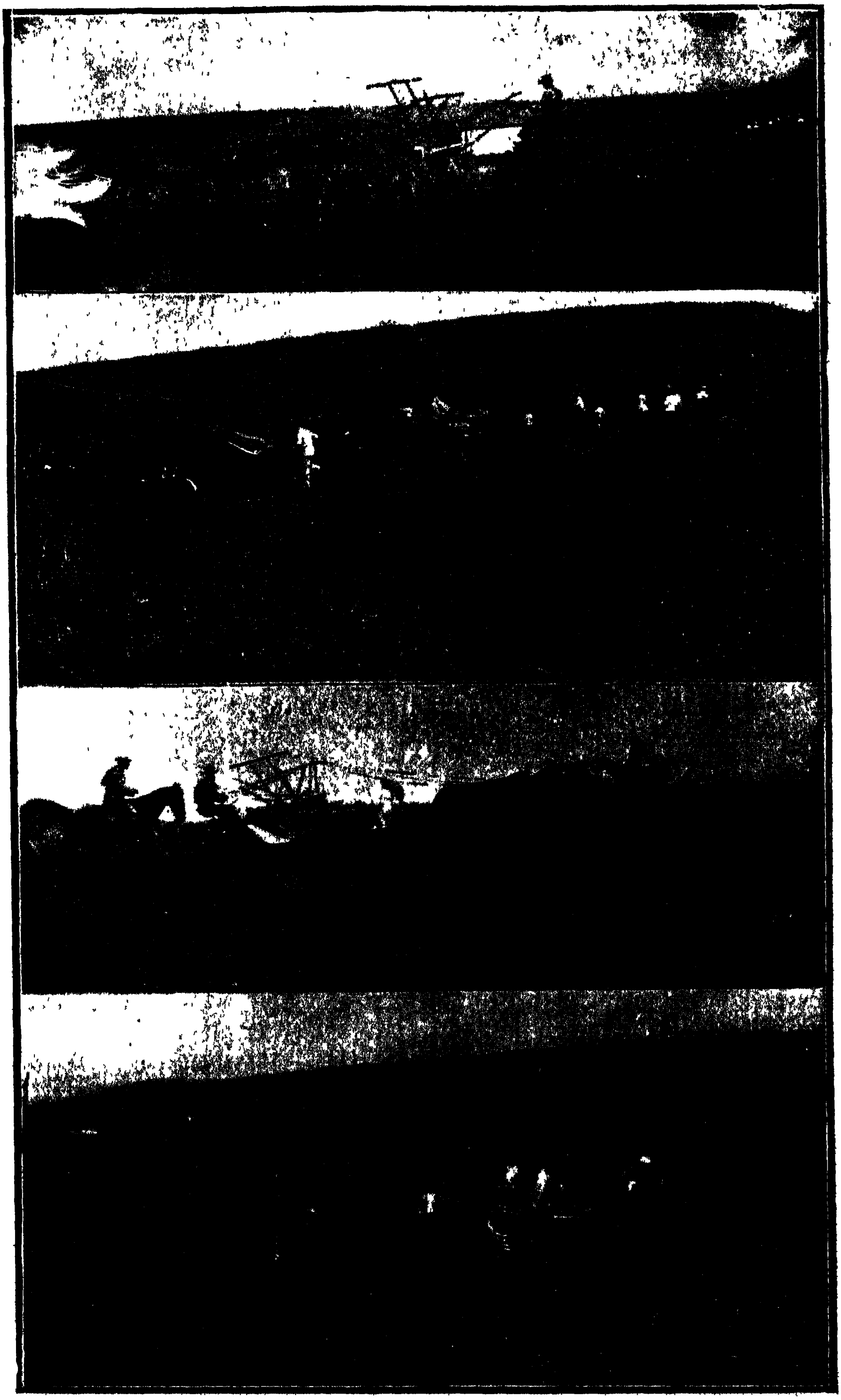
Eleven binders were entered for the competition, five of which were Massey Harris, two McCormicks, one Champion, and one Deering. A "Wood" machine was also entered, but arrived late for the starting, and was disqualified; however, the owner, not to be outdone, decided to give an exhibition. A Massey Harris reaper and binder, with an 8-foot cut, was also exhibited, and did good work, but it is doubtful if such a machine is suitable to the conditions of this Colony yet, and it seems a little heavy for the ordinary team used by our farmers.

The competition was carried out in fields of wheat, the crop being fairly good, though light, and by one o'clock all the machines had been started. The competition resulted in favour of Mr. Albertyn, the lessee of the farm, who, with a Massey Harris machine, accomplished the task set him in one hour 26 mins. Mr. A. Kennedy, of Moorreesburg, was second, with a McCormick machine, his time being one hour 14 mins.; whilst Mr. Loedolf, of Darling, was third, with a Massey Harris machine, in one hour 23 mins.

The other competititors were: Messrs. Fred. Duckitt, Towers (McCormick); F. Duckitt, Waylands (Massey Harris); F. Duckitt, Towers (Deering); T. Duckitt, Orangefontein (Champion); W. Basson, Bonteberg (Massey Harris); and Ferdinand Versfeld (Massey Harris).

The competitors were very close, the whole match being contested with the keenest possible interest, and the local arrangements, though a little faulty as regards the arranging of transport from the railway station, were very ably carried out by the Darling Agricultural Society.

While the machines were testing the skill of their drivers, a scythe competition was in progress alongside, which gave an interesting contrast. The scythesmen were all Colonial farm hands, and handled those implements with praiseworthy dexterity.



Snap Shots at the Harvesting Competition.

THE NEW METHODS OF MAKING DRY WINES.

By C. MAYER, late Viticultural Assistant.

The system of wine-making at the Cape is, with a few striking exceptions, unsatisfactory; badly fermented wine is frequently produced, wine containing portions of unfermented sugar, and therefore liable to unfavourable changes unless its strength is raised by an addition of spirit or the wine otherwise protected by the use of a preservative.

Recognising this state of affairs, various endeavours have been made to place wine-making on a satisfactory basis, unfortunately with little success.

This is, in my opinion, due to the fact of the control of temperatures during fermentation having exclusively received attention, whilst other matters equally important were lost sight of, namely, the improvement of grape juice by the use of tartaric, and tannic acids and metasulphite.

During the season 1905 I had an opportunity of producing about 150 leaguers of wine according to this method in two different cellars with no other appliances than are commonly found in every farmer's cellar at the Cape. The results were satisfactory, for the whole bulk of the wine was thoroughly sound, of good and uniform quality—developing later to the satisfaction of the purchasers.

One of the buyers, upon my request to advise me as to the development of the wines bought from me in 1905, writes on the 15th August, 1906, as follows:- -"We were extremely pleased with the manner in which the wines purchased from you developed, so much so that we have again bought the same white wine this season. We regret, however, that in view of the limited demand for red wines, we were unable to purchase any quantity of these." The second buyer, who took most of the red wines, writes on the 4th September, 1906, in the following strain: "We beg to inform you that the wine we bought last year from you turned out very well, and that the result of the trials we made with metasulphite has given us very great satisfaction, both in red and white wines. We intend making still further experiments next year."

On the strength of these testimonies, I venture to recommend to the wine-farming population at the Cape the system I have initiated as far back as 1900. As the first trials and tests were made by me when still in the Government service, I feel it my duty to give the Cape farmer my experience, and I propose to describe briefly the methods adopted by me.

Having regard to the dangers arising from bad casks, weeks before the vintage commenced every cask was thoroughly cleansed by steaming it, until every trace of sediment of past vintages had disappeared and I was fully satisfied as to the suitable condition of same. With as little delay as possible the casks were put back in the cellar, and, when quite dry, thoroughly sulphured.

About a week before the vintage began, a quantity of well-developed grapes were gathered and crushed into a thoroughly clean hogshead, from which the one head had been removed. The contents, consisting of pure grape juice, were allowed to start fermenting, and when fermentation was well up, metasulphite was added at the rate of 8 ounces for every ton of grapes. In consequence of this addition, fermentation was greatly impeded for about two days, and when well up again a further addition of metasulphite—half of the afore-mentioned quantity—was made. In this way fermenting germs were bred accustomed to the presence of sulphurous oxide, and this mixture was used in the course of the vintage as a starter in the way described later on.

At the time of the vintage, the grapes were thoroughly ripe; in fact, had a high percentage of sugar, the intention being to produce a full-bodied wine, both red and white; a considerable quantity of the must having more than 20 per cent. The grapes were gathered throughout the day, the very hottest hours excepted, suitably spread under the shade of trees, kept over night and handled next morning, together with those coming in till about 11 a.m. The crushing was done in the tub commonly used at the Cape, and, with the exception of a wine pump, no machinery was used.

Owing to the impossibility of obtaining tartaric acid at a reasonable price, I had to abandon my intention of increasing the acidity of the must all round and applied that system only to a few casks. To this special reference will be made later on, and I propose now to deal separately in a short and concise form with the making of white and red wine.

WHITE WINE.

The varieties used were Stein, Green Grape and a small quantity of French grape. They were all mixed together and only one description of wine produced. The juice running off the crushing tub was transferred into fermenting vats and at once charged with six ounces of metasulphite for every ton of grapes or a quantity sufficient to produce one leaguer of wine. In some instances the quantity of metasulphite was raised to eight ounces and applied in two doses of four ounces each.

The crushed grapes were continuously taken out of the cellar and filled into fermenting tubs placed outside under the shade of trees. The juice still running off was collected into a tub underneath and added to the bulk of the must. At night, when work was suspended, some water was added once and the juice running off the next morning again added to the must. A second and third washing was kept separate and afterwards distilled, three washings sufficing to obtain practically all the juice contained in the crushed grapes.

The must remained in the fermenting tubs exposed as much as possible to the cooling influences of the night by opening all cellar windows and even doors. When the temperature of the must had, in consequence, fallen several degrees, a few buckets of the previously described starter were added to each tub and thus fermentation initiated at pleasure, usually the second day after a tub had been filled.

After this, fermentation was allowed to proceed until it began to subside, when the still fermenting must was transferred into casks to complete fermentation. This transfer from the tubs to the casks occurred usually on the 5th day after crushing. In no case was fermentation accidentally interrupted in the cask; on the contrary it proceeded satisfactorily in every instance. A few days after completion of fermentation the new wine was transferred into another cask and an addition of 1 ounces of tannic acid for every leaguer of wine was made. The tannic acid was dissolved in a bucket of wine poured into the cask, and the wine pumped on the top of it to insure thorough distribution. After this, the casks were filled up once every week for about a month, and every two weeks afterwards. Each cask was tapped three times, so that by the end of winter the wines had developed well, being almost clear and quite free of even traces of unfermented sugar.

RED WINE.

The varieties used were Hermitage, and a very small quantity of Cabernet de Sauvignon. The crushed grapes were, together with stalks, placed in fermenting tubs and charged with eight ounces of metasulphite for every ton of grapes, six ounces being found insufficient in such a mass of material. To obtain the greatest effect in the case of red wine, it is advisable to divide the doses and apply the second dose about the third day by pouring the dissolved metasulphite on the top and pumping from the bottom of the tub the juice over it.

Fermentation was in two instances always completed in the open tubs, and great attention was paid to the steeping of the head of husks and stalks.

When transferred from the tubs to casks, the wine derived from rather ripe grapes received an addition of two ounces of tannic acid for every leaguer of wine. After this the wine was casked three times, and the casks carefully filled up as described before. Every cask was by the end of the winter perfectly clear and bright, some of the wine made of rather ripe grapes and grown on a heavy soil had more a Burgundy character; whilst the other was a characteristic Hermitage.

Records of Fermentation.

No. 1 tub filled in afternoon of 22nd February; temperature of must 21° C.; Sugar 20%; 4 ounces metasulphite per leaguer.

23 Feb.,	temperature	7 a.m.,	20° C.	
23 ,,	,,	5 p.m.,	20	little fermentation.
24 ,,	,,	7 a.m.,	20	fermentation active.
24 ,,	,,	5 p.m.,	21	fermentation very active.
25 ,,	,,	7 a.m.,	31	,, ,, ,,
25 ,,	,,	noon	33	,, ,, ,,
25 ,,	,,	6.30 p.m.,	34	,, ,, ,,
26 ,,	,,	6.30 a.m.,	34	,, ,, ,,
26 ,,	,,	noon	36	,, ,, ,,
26 ,,	,,	4.30 p.m.,	36½	,, ,, ,,
26 ,,	,,	6 p.m.,	36	slowing down.
26 ,,	,,	10 p.m.,	35	
27 ,,	,,	6.30 a.m.,	33½	
27 ,,	,,	4.30 p.m.,	33½	
27 ,,	,,	7 p.m.,	33	
28 ,,	,,	6.30 a.m.,	30	
28 ,,	,,	noon	29	
28 ,,	,,	4 p.m,,	28	

The wine was now put into cask, where it completed fermentation.

No. 2 tub filled at noon 23rd February, temperature of must 19° C., 21% Sugar, 4 oz. metasulphite per leaguer.

24 Feb.,	temperature	7.30 a.m.,	19° C.	
24 ,,	,,	noon	19	
24 ,,	,,	5 p.m.	19	starter added
25 ,,	,,	7.30 a.m.,	20	
25 ,,	,,	noon	20	
25 ,,	,,	6.30 p.m.,	21	fermentation going active
26 ,,	,,	6.30 a.m.,	29	
26 ,,	,,	11 a.m.,	31·5	,, ,, ,,
26 ,,	,,	5 p.m.,	34	,, ,, ,,
26 ,,	,,	7.30 p.m.,	35	,, ,, ,,

The contents were now aerated by tapping from bottom and returning on top.

26 Feb.,	temperature	10.30 p.m.,	33·5° C.	
27		6.30 a.m.,	35	
27		noon	35½	
27		4.30 p.m.,	33½	fermentation slowing down.
27		7.30 p.m.,	33	
28		6.30 a.m.,	30	
21		noon	29	
28		4 p.m.,	28	wine placed into casks.

No. 3 tub filled 5 p.m. 23rd February, temperature of must 30° C. Sugar, 20%. 6 ozs. of metasulphite per leaguer.

24	Feb.,	temper.,	7.30 a.m.,	24° C.	
24	,,	,,	noon	24	
24	,,	,,	5 p.m.,	24	
25	,,	,,	7.30 a.m.,	23	
25	,,	,,	noon	23	
25	,,	,,	6.30 p.m.,	23	
26	,,	,,	7.30 a.m.,	23	starter added.
26	,,	,,	noon	23	
26	,,	,,	1 p.m.	24	
26	,,	,,	10 p.m.	26	fermentation beginning.
27	,,	,,	6.30 a.m.,	29	,, increasing.
27	,,	,,	10.30 a.m.,	31	,, active.
27	,,	,,	2 p.m.,	33	,, ,,
27	,,	,,	7.30 p.m.,	34	,, ,,
28	,,	,,	6.30 a.m.,	36	,, ,,
22	,,	,,	noon	36	,, ,,
28	,,	,,	7.30 a.m.,	34	,, slowing down.
1	Mar.,	,,	7 a.m.,	29	,, slow, wine removed into cask.

No. 4 tub filled 27th February, temperature of must 25°C., Sugar 23%, 6 ounces metasulphite in two doses.

28	Feb.,	temper.	7 a.m.,	23° C.	
25	,,	,,	noon	21	
1	Mar.,	,,	7 a.m.,	20	little fermentation second dose metasulphite added.
1	,,	,,	7 p.m.,	20	
2	,,	,,	7 a.m.,	18	
3	,,	,,	7 a.m.,	18	slight fermentation.
4	,,	,,	7 a.m.,	20	active ,,

Contents had to be removed to cask where fermentation was completed; temperature not rising higher than 32 Celsius.

The aforegoing are all records in respect to white wine, it being impossible to collect any in respect to red wine on account of pressure of work. So much, however, is certain that the larger quantity of metasulphite had to be employed and was best given in two separate doses; the latter when fermentation was fairly active, and the temperature rose quickly in the vat as is also the case with white wine.

The metasulphite should be dissolved in a bucket or two of must or water and the mixture gradually distributed as the filling of the vat proceeds. On the strength of past experience, I recommend, however, the addition in two doses in every case as then fermentation is more efficiently checked.

The application of metasulphite will impart to all wines from the start a bitter taste. This, however, disappears in time, particularly, if care is taken to aerate the wine when transferred to the casks and afterwards at the racking after fermentation is completed.

In red wines it also reduced for a time the colour, but later the colour reappears and seemed to me deeper in wines made with metasulphite than in wines made without it.

The system herein described means of course a longer fermentation than farmers are accustomed to at the Cape and demands a somewhat larger number of fermenting vats. On the other hand, a slow fermentation means, as a rule, wines of good quality, and therein I recognise its greatest importance for the future development of Colonial viticulture. In itself, the system is applicable in every cellar; it is effective and has found recognition in almost all wine producing countries where high temperatures at the time of vintage endanger the production of sound wine.

Referring to the improvement of must by an addition of tartaric acid, one must bear in mind that the importance of a suitable quantity of fixed acids has been settled beyond doubt. The value of fixed acids has been recognised in the fact that they favour vinous fermentations, make the formation of volatile acid more difficult and impart to the future wine a certain freshness pleasant to the palate.

For good fermentation the total acidity of a must should not be below 7 per 1,000 calculated as tartaric acid (see Roos "Wine-making in Hot Climates," page 54) and should be raised to at least that point whenever the natural amount in must is lower. To do this, pure tartaric acid should be employed which, dissolved, must always be added before fermentation. On the whole 2 lbs. of tartaric acid suffice to one leaguer to raise fixed acids by one point, which quantity should be increased to at least 3 lbs. per leaguer when must with skins and stalks is fermented.

The tannic acid, on the other hand, should be added after fermentation in quantities mentioned before. The tannic acid not only acts directly as a licit preservative but also assists general development by favouring clarification. Its use is particularly important in respect to white wines as they always contain insufficient quantities, when fermented without husks, to precipitate the organic nitrogenous substances so dangerous to the wellbeing of wine.

The system is, and this is of great importance, inexpensive and costing at the rate of a few shillings only per stukvat. It does not require elaborate machinery such as has been recommended and introduced into the Colony with the advent of attemperators and is independent of a supply of water.

It is of course necessary that in its application care and consideration should be practised, and it may confidently be said that with care the production of good wine is assured.

THE KHAKI BUSH.

ANOTHER NOXIOUS WEED.

By R. W. Thornton.

During the last few seasons a plant, previously unknown, has been making its appearance in the grain lands of Tulbagh and portions of Piquetberg district. It has spread with such alarming rapidity, and possesses such undesirable traits that the Divisional Council have considered it necessary to take active steps in the matter, and after consultation with the Department of Agriculture have resolved, if possible, to extirpate the weed before more mischief is done, and to this end, it has been duly proclaimed a noxious weed in that district in terms of Act No. 18 of 1898 by Proclamation No. 420, 1906.

The Khaki Bush is a species of *Aplopappus*, but it has not been possible yet to identify it more exactly, though this will presently be accomplished. The plant is an annual shrub, rising on a straight main stem to a height of about from two to three feet, with fine pointed leaves and light yellow flowers, which yield an enormous quantity of fine seed liable to be transported to clean areas by the wind or in the wool of sheep. The leaves when bruised exude a strong odour, and are of a bitter flavour and sticky nature. The withered plants assume a dull fawn colour. It is from such that the accompanying illustrations are reproduced.

The Khaki Bush was first observed on the farm of Mr. Wiggins, Halfmanshof, in the Tulbagh Division, and as suppression was at that time a matter of impossibility, it got a firm hold from the beginning.

As the plant is natural to Canada, it is highly probable that the seed came with forage or grain from that country for the military, hence the name, Khaki Bush. It made its appearance in November, almost, but *not quite*, contemporaneously with the ripening of the oathay. So far this season (November, 1906), it has not yet been noticed, and the oat crop having been harvested, so that there seems no reason to fear distribution of the seed, in oathay from the districts affected; a most fortunate consideration for the producers and buyers of that staple commodity.

Since its first appearance, the Khaki Bush has spread with astonishing rapidity, now covering an area of perhaps thirty miles

The Khaki Bush.—The section shown at the side is the natural size of the smaller branch.

long by five wide, with sundry sporadic appearances at new centres round about, and is menacing a wider area yearly.

The seed is light and plentiful, readily carried by wind or in the fleeces of sheep.

The weed grows on cultivated and fallow lands, and its presence is harmful. Firstly, in that it occupies land to the exclusion of opslag and other herbage, and grows so densely as greatly to interfere with the ploughing, rendering it in places almost impossible without clearing all cultivated land before ploughing every year, which entails considerable expense. It is also said that this bush greatly impoverishes the soil for wheat and oatcrops, besides, as already stated, smothering the crop of grass, etc., on the fallow lands, which form the principal grazing areas in that part.

When ripening, the seed gets into, not only the fleeces of the sheep, but also into their eyes, causing complete, though temporary, blindness.

So far as experience goes, it would seem that this pest can only be eradicated by ploughing, cultivating, burning and hand-pulling as soon as the plant shows itself above ground Later in the season, owing to its sticky nature, ploughing is rendered impossible, but if the land is ploughed while still wet enough, toward the end of the rainy season, and then cultivated or disc-harrowed once or twice during early summer, this will undoubtedly greatly reduce the pest in the course of a few seasons.

That this is a pest against which it is not impossible successfully to cope is evident from the case of farms lying in the centre of the infested area, such as those of Messrs. Immelman, at Halfmanshof, which are being kept quite clean. The first cost of extirpation is in such cases considerable, and without joint effort by all affected, the danger of reintroduction of the weed is ever present.

Essentially this is a case where co-operative effort is indicated, and the Divisional Council of Tulbagh have wisely made this compulsory by putting Khaki Bush on all fours with Burr Weed, compelling farmers to keep it down, and thus benefit, not only themselves and their neighbours, but also nipping in the bud a danger which is threatening the whole grain-growing districts of the Western Province, possibly of the whole Colony.

It is sincerely to be hoped that the powers given under the Act will be energetically enforced, and meet with the loyal support of the farmers on whose land the weed is prevalent, and in whose interests the machinery of the law has been set in motion.

Credit is due to the action of Tulbagh in the matter, and the neighbouring districts where Khaki Bush is already present, or to which it may readily spread, should follow the lead given, and so, not perhaps without some trouble and expense, prevent an evil which, if neglected, may, within the course of a few years, develop into a calamity of some magnitude.

PRACTICAL GUIDE FOR THE DISTILLATION OF WINES, MARCS, LEES AND FRUITS.

FOR THE USE OF VIGNERONS.

BY V. VERMOREL.

Director of Viticultural Station, Villebranche; President of Agricultural and Viticultural Society, Beaujolais; Vice-President of District Society of Viticulture, Lyons; Chevalier of the Legion of Honour, etc., etc.

(*Translated from the French by I. Tribolet, Viticulturist at Elsenburg Agricultural College.*)

PREFACE.

Distillation consists in the separating of alcohol from any liquor that contains it. Many substances furnish alcohol. We will here only deal with those that the vigneron manufactures and that he can utilise directly.

Classes: They may be divided into two, 1st, wine and all the residues of its manufacture; 2nd, the liquids that may be obtained by the fermentation of various fruits—apples, pears, cherries, plums, apricots, gooseberries, strawberries, etc.

Whatever fruits are used, we obtain the same alcohol (ethyl alcohol C_2H_6O) when it is pure.

Nevertheless, it may acquire special qualities of taste and perfume which will give it a definite character, for example, Cognac, Kirsch dop, etc.

The manufacture of alcohol always entails three distinct operations:

1st. The manufacture of the must or liquid containing fruit sugar (grape sugar $C_6H_{12}O_6$).

2nd. The fermentation of that must; or the conversion of the sugar into alcohol.

3rd. The distillation of the liquid obtained; or the extraction of the alcohol it contains.

PART FIRST.—DISTILLATION OF WINE AND ITS RESIDUE (WASTE PRODUCTS.)

Wine, of all the alcoholic liquors, was the first that was submitted to distillation, and during a long period was the only source of alcohol. We will not mention here the many processes of wine making. We will only say that from the point of view that interests us, wines may be divided into two classes. One class gives brandies with an aroma distinctive of the vines, the soil, or the method of manufacture, such as cognacs and armagnacs. The others, which do not possess this special aroma marking high class brandies, produce ordinary alcohol.

Common Brandy.—Before the invasion of the Phylloxera, the manufacture of this product had attained great importance in the South of France, where a lot of wine was made. The annual output reached from 20 to 23 million gallons. These brandies are known to the trade as Montpellier brandies.

Both red and white wine may be distilled. But there exist, nevertheless, differences in the quality of the brandies depending on the different ways in which the wine has been made. Thus a wine fermented on the husks and stalks gives a less delicate brandy than the brandy that has been obtained from a wine made from must separated from the bunches by pressing.

The difference in quality is due to the fact that with the latter method, the wine not being fermented on the husks, etc., contains fewer essential oils of a strong and disagreeable odour which characterises marc brandies.

These oils, which are contained in the husks and seeds, become dissolved in the wine, and in distillation find their way into the alcohol. That is why white wines made from separated must make better brandies than red wines.

Distillation of the Lees of Wine.

Although the lees contain 60 per cent. of wine they are too thick for direct distillation. The liquid can be extracted by pressing, and then distilled, or the mass may be diluted with from two and a half to three times its volume of pure water to make it suitable for the operation. The lees contain as much alcohol, proportionally, as the wine that produced them. Brandy made from lees has not the value of wine brandy, nevertheless, when well made it has some very good qualities. As the lees have a tendency "to froth up," care should be taken not to fill the kettle, and the heat should be applied gradually.

Distillation of the Wine and Marc of Raisins.

Wine made from raisins can be distilled in the same manner as other wines, and when they are sound they give a brandy free from objectionable tastes.

sometimes, however, it contracts the peculiar flavour of the raisins. The marc of 2,000 lbs. of raisins gives from three to four gallons of brandy of 60 per cent. strength.

Distillation of Sick Wines.

Sick wines can also be distilled, but their alcohol acquires a sour, sharp, and hard taste that renders it inferior to the alcohol produced from sound wines. Wines that are "pousses," "tournes," "bitter," "greasy," may be placed in the still without treatment, only care should be taken to keep separate from the bulk the first and the last runnings (*eaux de tetes et de queues*).

As for pricked wines, they should undergo some treatment before distillation. The brandy they give possesses a pronounced acidity and a disagreeable taste. Before distilling them the acetic acid they contain should be neutralised by some alkaline substance, such as potash, soda, or, better still, lime (and by preference tartare neutre de Potasse), neutral potassium tartrate.

The dose varies according to the acidity of the wine; in general a dose of 11 ozs. of quicklime (CaO) to the leaguer is sufficient. A well diluted milk of lime is prepared which is poured into the cask and well stirred. After 24 hours the wine is drawn off to separate it from the deposit. It is then distilled with care.

In order to obtain a very pure brandy it should be distilled a second time. If, instead of lime, tartrate of potassium is used (a matter of from 4 ozs. to 2 lbs. to the leaguer, according to the amount of acid to be neutralised), it is unnecessary to distil twice.

Wines having the taste of casks, ullage, mustiness, etc., should be treated before distillation in the following manner: They should be put into sweet, clean casks, and three bottles of pure olive oil per leaguer added to the wine; thoroughly rouse, and at the end of 24 hours, when the oil will have come to the surface, carefully draw off the wine to separate it from the oil. Should one operation not be sufficient, repeat the treatment.

Aging of Cognac.

Brandy just made is limpid and colourless. It is through being kept in oak casks that it acquires the colour or tint with which we are acquainted. These casks, if they have not been already used, should be washed with boiling water, so that the soluble extracts in the wood will not convey a bad taste to the brandy. Cognac should not even be allowed to age in new casks; after being in them six months, it is racked into old vats, where it is allowed to mature. It is in aging that cognac gets its mellowness and reaches perfection, and only at the end of from 20 to 30 years can it be put on the market, according to the degree of strength it shewed on distillation. When it is to be used young, it ought to mark from 60 deg. to 68 deg. If it is to be kept for a long time it should be run off at from 70 deg. to 74 deg., for it loses strength in aging.

When it is reduced through keeping to 52 deg., it is considered fit for consumption. For first quality products this is a process that should be followed to the letter.

To produce marketable brandies more rapidly, the alcohol is reduced by blending (breaking down) with distilled water or with brandies of 20 deg. strength. These weak brandies should be allowed to mature for a year at least in new casks, bunged, and without ullage.

In this case they acquire the taste and colour of old brandy, also an aroma which they impart to the young and strong brandies that we wish to make.

When kept in casks that have been used, a few handfuls of oak shavings are put into the cask; after having been first steeped in water.

These light brandies should at the time of blending have a strength of at least 16 to 17 deg.

Brandy from American Vines.

Wines from American direct bearers have a foxy taste. It has been asked if that special flavour would not remain in the brandy made from those wines. From experiment, it has been found that Jacquez, of which the wine is one of the freest from any foreign taste, gives only an ordinary brandy, but much cleaner than many of the others.

The Elvira, from which great things were expected in the reconstitution of the vineyards of the Charantes, gives a brandy of a peculiar flavour, with none of the characteristics of cognac. The same may be said of Noah.

Marc Brandy (Dop).

We know that marcs (refuse from the press) contain a certain quantity of wine, which has been estimated by Payen at 12 to 15 per cent. of their weight. Marc can be utilised in various ways, especially by extracting by distillation the brandy it contains. The vinous liquid contained by the marc is very alcoholic.

According to the computation of large proprietors and distillers, 2½ leaguers of the liquid give ¾ leaguer of brandy, whilst to obtain the same quantity it requires 8 leaguers of ordinary wine. But the brandy from marc is inferior to brandy from wine on account of the higher alcohols that it contains. Apart from this, it contains many essential oils and a characteristic woody (empyreumatic) taste.

Marc may be treated in two different ways. If you wish to distil at once, as soon as it leaves the press it is put into a vat, where it is carefully divided (crumbled up, disintegrated); enough water is added to submerge it, and it is left to ferment for a few days, and then it is distilled.

This is the best process.

But if for various reasons one cannot treat the marc at once it is kept in vats or tanks. In doing this, the marc is crumbled up, and each layer tramped down in such a way that the whole mass is tightly pressed together. It is first covered with a layer of straw, and then a layer of four to six inches of earth, or plaster is put on top.

Treatment of Marc by Maceration.

The marcs treated by maceration, and only distilling the vinous liquid they contain, give, as we have already said, brandies similar to those made from wine.

Piquettes are distilled in the same way as wines.

The extraction of the juice held by the refuse grape stalks (rafles) is brought about by the addition of one and a half (1½) times its volume of water at a temperature of about 30 deg. C. (86 deg. F.)

When the berries thus put to soak have swelled up, which takes place in about twelve hours, they are put in the press to extract either the piquette or the sugared juice if they are unfermented marcs.

If you do not want to press, the liquid is simply drawn from the macerated mass, and if it is piquette, it is sent straight to the still; if it is unfermented must it is allowed to ferment before doing so. The liquid, drawn off after twelve hours' soaking, is used in the following operation with fresh marc instead of pure water. When there is a quantity of marc to be treated on a large scale, several maceration vats are used in such a way as to constitute what is called a battery. Four to six vats, according to the richness (quality, density) of the marc, each one containing a false, perforated bottom, fixed about four inches above the real bottom. It is on this false bottom that the marc is thrown. A pipe is connected from the top of one vat with the space in the next beneath the false bottom. This tube is open right through from above to allow the direct introduction of water.

The macerated liquid passes successively through all the vats, in which it remains several hours, and finally comes through the last in the form of piquette.

The displacement of the liquid from one vat into the other is caused by introducing water under the false bottom of the first vat through the top of the pipe attached to the preceding one. The macerated liquid driven from the bottom to the top flows out at the top of this vat, and under the false bottom of the next, driving out the liquid that is found there into vat No. 3, and so on till it comes to the last. After a number of macerations equal to the number of vats, the exhausted marc of the first vat is taken out and replaced by fresh. This vat then becomes the last of the series; the one from which the piquette is drawn; and vat No. 2 becomes the first. Later on it will be vat No. 2 that becomes the last, and No. 3 the first, and so on right through.

This maceration, called methodical (diffusion) gives the best results. It furnishes piquette of the highest possible strength, and completely exhausts the marc.

Direct Distillation of the Marc.

The marc can be distilled in two ways. It can be treated directly or it can be washed, and the water thus obtained distilled.

In the first case the kettle is filled with marc, then enough water is added to float or submerge the mass in order to prevent the solid particles adhering and burning on the sides and bottom of the kettle, and communicating a disagreeable flavour to the brandy.

Distillation of Piquette.

Marc brandies of a superior quality can be obtained by operating directly on the washings of the marc, or piquette. Piquette, as has already been stated, is obtained in two ways, either by the addition of water after pressing, and allowing it to ferment, or by methodic maceration (diffusion). It is then distilled as ordinary wine. As the piquettes contain a relatively small quantity of essential oils of foreign flavour found in the marc, they give brandies of superior quality to those obtained by the direct distillation of the marc.

Distillation of Sulphated Marcs.

On account of sulphates being used to combat mildew, one may sometimes find in the vintage small portions of copper, but in every instance distillation may be gone on with, and no danger apprehended, as the alcoholic vapours cannot carry off the copper which remains in the residue.

Marc of White Grapes.

The marcs of white grapes, which have not been submitted to fermentation contain a sweet juice but no alcohol. To convert this sugar to alcohol, it must be allowed to ferment. To bring this about it is thrown into a vat, where it is carefully broken up (disintegrated); then enough warm water is added to completely immerse it.

At the end of six or eight days the piquette can be drawn off and distilled. It is considered by a good many that there is no gain in distilling the marc of white grapes on account of the poor returns, and that it pays better to feed it to cattle or to employ it as manure.

Distillation of Vinasse.

The liquid remaining in the kettle (still) after the distillation of wine, is called the vinasse.

This liquid, which contains all the elements of wine, less the alcohol and a few aromatic principles, may be utilised if the alcohol which it lacks is again added. You simply add to the vinasse ordinary spirits of good flavour of 95 per cent. of strength in the proportion of 45 to 60 bottles per leaguer, according to the original strength of the wine. The liquid is well stirred and left to stand for two or three days. The alcohol is flavoured by the wine aromas in the vinasse, and you obtain by distillation a brandy possessing the special flavours of wine brandies.

Tartar Crystals.

Extraction of the Tartar Crystals contained in the Marcs.

Grapes contain a very appreciable quantity of cream of tartar (bitartrate of Potassium), part of which is dissolved in the wine and part remains in the marc.

After distillation it is extracted by a very simple process, based on its difference of solubility in hot or cold water. One part of cream of tartar, that takes 182 parts of cold water to dissolve, is quite soluble in fifteen parts of boiling water.

After distillation, the marcs are submerged and allowed to soak for 15 to 20 minutes in boiling water, the minimum time necessary to dissolve the cream of tartar. This water is drawn off and allowed to cool in tubs, in which strings are stretched vertically, or in which wisps of straw are placed in such a way as to present a wide surface to the liquid. The tartar, which is with difficulty soluble in cold water, is set at liberty by the heat, and in the process of cooling attaches itself to the strings, the straw, and the sides of the cask. The cold water, called the mother water, still contains a little tartar, which has not been deposited; so as not to lose it, this water is used in the distillation of fresh marc instead of pure water. After some time (after several operations) the small crystals of tartar are withdrawn and dried in the air or in a gentle heat. Thus obtained, this tartar is coloured, and is generally sold to colourists (painters) or manufacturers of tartaric acid.

Bleaching of Tartar Crystals.

When the quantity of cream of tartar produced is considerable, it is more profitable to sell it bleached.

To accomplish that, it is dissolved in a copper boiler with 15 to 18 times its weight of boiling water. After boiling a considerable time, and the tartar is completely dissolved, pure clay quite free from lime, to the amount of 3 per cent. of the weight of the tartar is added. The whole is poured into a vat and allowed to cool. After the cooling is complete, the mother water is drawn off, and the adhering crystals are detached from the walls of the vat and washed with cold water to carry off the colouring matter and clay with which they are covered. Cream of tartar thus treated is colourless. If it is desired to refine it further, it is again taken and dissolved in from 15 to 18 times its weight of boiling water, and 1 per cent. of animal charcoal is added and the whole kept boiling for two hours. The liquid is filtered, and it is allowed to cool and crystallise in a vat. The crystals obtained after cooling are very white and very pure. They are exposed for some time to the action of the air, and constitute the pure cream of tartar of commerce.

Returns of Tartar.

Some mares contain little tartar, others produce up to 3 per cent. of weight of mare. The average is from 1 to 2 per cent. of unrefined tartar. The price varies from about 11d. to 1s. 9d. per lb., according to the proportion of bi-tartrate of potash it contains.

Testing for Amount of Tartar.

The process employed for testing the richness of tartar is known as the "Casserole test." You boil for ten minutes in a porcelain bowl 1¾ ozs. of the tartar to be tested in one bottle of water. The mixture is then decanted, leaving at the bottom any insoluble matter. This liquid is allowed to settle at the ordinary temperature. In about twelve hours the refined tartar is crystallised. The crystals are collected and carefully washed with cold water, and then allowed to dry.

The weight of these crystals in grammes, multiplied by 2 and increased by 10 degrees represents the true tartaric content.

Extraction of Tartar from the Lees of Wine.

The lees contain cream of tartar deposited by the wine; its mode of exhaustion is the same as that used for the tartar of mares. As soon as distillation is finished, the mass of refuse is roughly and rapidly filtered before it has time to cool, and the liquid is put into a crystallizing vessel, where the tartar is deposited and afterwards collected.

PART SECOND.—DISTILLATION OF CIDER AND PERRY.

Cider and perry are alcoholic drinks prepared from apples and pears.

The composition and strength of cider varies according to the quality of the fruit and its mode of preparation. Ciders without the addition of water contain from 6 to 8 per cent. of alcohol. Table ciders contain hardly 4 per cent. When the fermentation of cider is completed, which usually takes several months, it can be distilled. The return from apples averages in pure alcohol 6 to 7 per cent. of their weight.

Spirit from new cider is very harsh, but in aging becomes milder and has rather an agreeable odour. Perry, which is made like cider, gives, when it is pure, from 6½ to 7½ per cent. of alcohol absolute.

The alcohol obtained from perry is considered better than that obtained from cider. Diseased (sick) ciders and perries give brandies with a bad taste. As we have indicated for wines, when these beverages are pricked they should be neutralised by milk of lime before distillation.

Treatment of the Marc of Apples and Pears.

The marcs of apples and pears may be used for making spirit. The operation is the same as for that of grapes. They are fermented and stirred up in a vat with about 100 bottles of water added to every 210 lbs. of marc.

The marc can then be distilled as a whole, or what is better from the point of view of quality, only distil the liquid that is extracted by pressing the marc.

These marcs give at most from two to three bottles per 210 lbs.

Distillation of Stone Fruits.

Cherries, plums, peaches and apricots may, in common with all fruits containing sugar, be used for distillation. To that end it is sufficient that they should be fermented so as to transform the sugar into alcohol. The mode of operation is very simple. Cherries, plums, etc., are allowed to become thoroughly ripe; they are then gathered, taking care to reject the stalks and the decayed fruit.

They are then mashed without breaking the kernels, which are left in the mass, which is put in a vat and treated like grapes. At the end of 15 to 20 days the fermentation is over. They could then be distilled at once, but they are generally left a month or two in order that the alcohol shall have time to extract from the kernels the taste of bitter almonds that characterises the spirit.

During this time the liquid mass should be carefully put away in casks, kept full and well bunged, to prevent contact with the air.

When cherries are distilled, care must be taken to put aside the first spirit that comes through the still, and also the last as soon as it becomes milky. This latter is again distilled with the next lot put through. Whilst the heads (faints) may be neutralised by the addition of 20 ozs. of lime per leaguer, and 24 hours afterwards it may likewise be passed through the still. To give aroma to the kirsch (as this brandy is called) some distillers crush 1/20th of the kernels before distillation.

But they lose in quality what they gain in aroma. With careful handling, 210 lbs. of cherries may give from eight to ten bottles of kirsch. The vinasse of cherries is treated as that of wine.

ELSENBURG AGRICULTURAL COLLEGE.

THE YEAR'S WORK.

DISTRIBUTION OF PRIZES.

A considerable number of visitors from Cape Town and the district of Stellenbosch made Elsenburg College the objective of a journey on the 18th ult. The occasion was the distribution of prizes to the successful students for work during the last twelve months.

An excellent light luncheon was served in the main hall just after one o'clock. Conventionality was at a discount, and the proceedings were very successful. Amongst the dainties served were an abundance of fine strawberries and some fresh cream, to which the visitors did justice. Afterwards the party were escorted round the grounds, and shewn the fields, the laboratories, lecture rooms, and students' quarters. Then there was a parade of the stock on the farm, when the students led some fine cattle round the paddock for the inspection of visitors.

Later the party assembled in the main dining-hall, under the presidency of Dr. Hutcheon (Director of Agriculture), to witness the main event of the day—the distribution of prizes. The large room was well filled with the students, their relatives and friends, and the members of the Cape Town party. Amongst those present were: The Hon. A. J. Fuller, M.L.A. (Minister for Agriculture), Mr. P. J. Hannon, Mr. C. W. H. Kohler, M.L.C., Mr. Henry Cloete, M.L.A., Mr. J. F. Juritz (Government Analyst), Mr. H. R. Hewitt (Civil Commissioner and Resident Magistrate), Mr. P. Myburgh, and Major Micklem.

In his opening remarks, the Chairman said he was pleased to take the chair, for he was very much interested in the work. The success of the College during the year shewed it was going to regain its position. The foundation had been made secure, and this would lead to its continued success. He apologised for the absence of Colonel Crewe, Mrs. Fuller, Dr. Viljoen, M.L.A., Dr. Beck, M.L.A., Dr. Nobbs, and Professor Beattie, and, in conclusion, introduced Mrs. Hutcheon, who, he said, would present the prizes, owing to Mrs. Fuller finding herself unable to be present.

Mrs. Hutcheon then presented the prizes as follows:

Dux of the College: W. E. Mottram, Klipplaat (gold medal).

Proxime Accessit: A. V. Hume Dold, East Griqualand.

First-class Diplomas: W. E. Mottram, A. V. H. Dold.

Second-class Diplomas: A. E. Rivett, Cape Town: A. J. Stigling, Hopefield.

CLASS PRIZES.

Agriculture and Stock: C. Dymond, Mossel Bay.
Fruit Culture: W. E. Mottram.
Viticulture: A. E. Rivett.
Dairying and Poultry: W. E. Mottram.
Agricultural Engineering: C. Dymond.
Best Botanical Collection: C. G. Mottram, Klipplaat.
Botany: C. Dymond.
Veterinary Science: W. E. Mottram.
Agricultural Chemistry: C. Dymond.
Woodwork: A. E. Mugglestone.

JUNIORS.

Medallists: G. W. Marshall, Queen's Town; J. C. Masson, Vryburg.

Proxime Accessit: G. B. McMillan, Cape Town.

CLASS PRIZES.

Agriculture: J. C. Masson, 1; N. Warren, East London, 2.
Fruit Culture: J. C. Masson and G. W. Masson, equal.
Entomology: J. C. Masson, 1; G. B. McMillan, 2.
Chemistry: N. Warren, 1; J. C. Masson, 2.
Veterinary Science: J. C. Masson, 1; G. W. Marshall, 2.
Botany: G. B. McMillan, 1; J. C. Masson, 2.
Agricultural Engineering: G. W. Marshall, 1; V. Zahn, Frenchhoek, 2.
Woodwork: V. Zahn.

The Hon. A. J. Fuller, in the course of a brief address, congratulated the principal, staff, and students on the work during the year. The future of the country lay in the hands of the young agriculturist, who would have to work on land a tithe the size of that tilled by his father. In the past, agriculture had not been looked upon as an ennobling science. A training was necessary for the future, and he hoped that every father would place his cleverest sons on the soil. If that had been done in the past, they would have made greater agricultural progress than they had. The older farmers had not had the opportunities of the Colonial youth of to-day, who should make good use of his opportunities. He was glad to see so many present that day, for it shewed that they agreed with him that the future of the country depended on the farming population. He believed that there was no better country in the world than South Africa. They had soils equal to any; they had pastoral parts of the Colony as good as any other country, and it was brimful of possibilities. All they needed was intelligent people to bring out those possibilities. He believed they had them in the youth of the country, who should now be given every opportunity. He hoped that the students starting in a new life would be examples to those not so fortunate. They trusted that the country would become in the future a big South Africa, and he hoped that agriculture would be in the forefront.

Mr. Henry Cloete, M.L.A., referred to the excellent work done at the College, which had been going on very successfully under the supervision of Mr. Jack. Continuing, he said that he had been on the Advisory Board, and that the College was an institution which should be fostered and not starved. He would say that they had the ability in the country, and he hoped that the time was not far off when farming would be taught by some of the residents in the country. In moving a vote of thanks, he said that the chairman, as Director of Agriculture, was a valuable asset to the country.

Mr. C. W. H. Kohler, M.L.C., in seconding, said that the feeling towards Elsenburg College had changed, and he thought the result would be that every year there would be an increased number of students in attendance. In conclusion, he congratulated the Ministry on what it had done for the farming community, and as a farmer he admitted much had been done. As a suggestion, he thought that classes of farmers might be held, as in America, in order to teach them stock judging and kindred subjects. He thought the matter might be given consideration.

Mr. Levey, R.M. of Zeerust, said he was agreeably surprised to find that the students not only went into farming theoretically, but did the rough work. He believed the Government should spend a larger amount of money on the institution, that it should become reproductive and be a benefit to the country. Unless they had more producers and less consumers, they would never succeed.

Mr. Jack, the principal, in the course of a few remarks, said that a great deal had been talked about the institution which should never have been talked at all. He did not believe that every man, as had been said, from the institution was of the "hothouse" type; there had been good men as well as bad. There were some people who would always regard the place in a wrong light. Undue haste, he contended, was at the root of the trouble, and that haste had not yet left the place. It was perfectly immoral for any people or class of people to find fault with unfinished articles, when these articles only remained six months. He made these remarks in justice to the interests of the institution. Nine-tenths of the failures were due primarily to many having left the College before the proper time had expired. He regarded the time as all too short for a course of instruction; it should really be three years. He had come to the conclusion that the South African youth was as capable as the youth of any other country in the world. He suggested that wealthy Colonists might show their patriotism by the endowment of bursaries, and congratulated the students on the good work during the year. In conclusion, he proposed a vote of thanks to Dr. Jameson, Colonel Crewe, Mr. Fuller, and Messrs. R. M. Ross and Co., G. Findlay and Co., R. Wilson, Son and Co., W. and G. Scott, T. M. Millar, Woodhead, Plant and Co., J. G. Steytler and Co., J. Forrest and Co., White, Ryan and Co., Darter Bros. and Walton, and Dr. Beck, M.L.A., for the donation of the prizes.

Other votes of thanks were proposed and adopted. Tea was served before the company left for town.—*Cape Times.*

THE FARMING CAPABILITIES OF THE EASTERN COASTAL BELT.

At the last meeting of the Komgha Farmers' Association the following paper was read by Mr. Walter A. Edmonds, of Ewanrigg:—

Gentlemen,—Your President has asked me to read a paper upon the capabilities and development of our coast belt, or, in other words, prove that farming on the coast is a paying matter, and that not only under the present circumstances, but upon the whole, can compare favourably with inland. I hear several of you say that is quite an easy matter, merely buy the ground, and let it to natives at rack rents, and there you are: sit at your ease and enjoy the income. But is this method sound, good for the State, ourselves, children and the natives themselves? You know it is not. The means I shall suggest, savour more towards the strenuous life, or, to use a vulgarism of the age, towards "bucking up and bucking in." I have known and seen parts of the country where the farmers have thriven by leaving all to nature, but here on the coast kindly nature must be controlled, as at times, what with heavy rain and heat, she knows no bounds. For example, this present spring we have had already over 25 inches of rain, creating a prodigious vegetable growth. We all know that 25 years ago the coastal area was the favoured farming ground. The farm books of the estate, Ewanrigg, rating from 1869 to the present day, prove from the prices paid that at all events stock were cheap; oxen from £3 10s. to £5, sheep (ewes) 7s., sheep wethers 4s. 9d. to 8s. 6d., sheep lambs 2s., oathay 3s., and wool selling in London 1s. 5½d. (1869) to 1s. 9½d. (1871). What was the result? Well-to-do farmers, a thriving business community, and general contentment What is it that has upset this pleasant Arcadia ?

TICKS.

Native wars and rinderpest left their deep marks, but the tick diseases, such as heartwater, redwater, etc., caused the ruin, decimating the herds, making men in disgust (not understanding the cause) seek pastures new, where the tick did not exist, and where diseases were normal and losses of 600 and 700 sheep per season unknown. All left who could. Some clinging to the old homesteads remained to constantly bemoan the present state of coast farming, to lose heart with their dwindling stock and damn their surroundings with the cry that the coast is no good. Their sons brought up constantly hearing the tale of woe, sought fresh openings, and other fair farming grounds awaiting occupation, rather than stay and take the place of the old folk, develop the farms, and infuse that young fresh vigour so beneficial; in fact, leaving, in many cases, the soil for the town; the result being that many of these farms went from bad to worse, and have eventually found their way into natives' hands.

When things were very dark, a silver lining appeared to the clouds in the belief, verified by our Agricultural Department (all honour to the then Veterinary Surgeon, Dr. Hutcheon, and our clever Entomologist, Mr. Lounsbury), that the ticks were at the bottom of all evil, and if only you conquered them, you could not fail to be top dog; then the pine-apple, citrus-growing and fruit generally, were discovered to do well, also cereals of a rust-resisting type, and that great standby to the agriculturist, the potato, giving splendid crops if fresh seeds from other parts every two years be used. That effort and intense cultivation on the grand gardens in and around the towns, from Durban to Cape Town, as also in the local orchards now coming to the fore as at "Prospect," etc., etc., where the far-famed Californian and Floridian conditions are surpassed. Do we thoroughly appreciate our enormous coastal advantages a fine summer, a splendid, almost dry, winter, with just sufficient rain to give the veld a constant, gentle spring growth, no frost to kill and wither the nutritious succulent growths, not requiring the farmer to spend most of the summer growing stuff to carry his stock through the winter; thus enabling profitable farm work to be constantly continued? Who hears upon the coast of nearly all the stock dying from poverty and drought? The crops are grown with the natural rainfall, and where properly cultivated may be reckoned on, bar locusts, which I see are really to be tackled by the combined States. Then the markets are at our door, saving that big tax, railway rates, which, when paid on produce, so often leaves a deficit. Our good growth of wood is most convenient for shelter, timber and firewood. Who is there that has farmed up-country in woodless parts who will not fully appreciate these advantages? I remember, when farming in Griqualand West, an empty soap box was looked upon as a treasure, it being wood.

The constant streams and rivers, a source of joy, with their unpolluted freshness, giving the stock that pure drink that the majority of the up-country dams know not, creating the best of milk, butter, beef and mutton, always close at hand, babbling contentment to all stock, and only asking to be led or pumped out on to the usually fertile adjoining lands.

Where does the prime beef for the Christmas and winter sales largely come from? Fattened upon the coast lands, between the Kei and the coast, a meat; butchers will tell you, equal to the noted best English or Scotch fed. Even thus with all our good and fattening grasses, some of our farmers are contemplating turning their broad acres into paddocks of paspalum. My neighbour has already scores of acres broken up which he intends, after having had them cropped by natives, to put down with paspalum, which my friend, Henry Flanagan, assures me, as a grass, is miles ahead of any of our natural grasses, a big assertion when we think of the splendid grasses we have.

There is also the possibility of lucerne doing well in the sandy stretches on the coast. I am told that in the Alexandria district it is proving a success. I conclude that from the decomposed shells in the sand, it would gather all the lime it loves, which being absent to a great extent from our ordinary soil, has not here made lucerne the success it was hoped. Will the countless herds of sheep again walk our coast pastures, is asked by many. I say with confidence that there is no reason why they should not. My personal experience of some 20 years' coast farming with sheep upon a fairly big scale makes me to speak knowingly, when I say they can be, and are kept profitably on the coast. Heartwater, the bane of the sheep farmer, must disappear with the tick. So sheep farming now, and for some time simply means keeping the ticks down by dipping and handling. I remember in the eighties reading an account of a meeting in, I fancy, the Fort Beaufort district, when an old farmer said he believed that the mortality in the small stock was caused by the tick. My experience coincided with his, and led me to fight the tick, and has enabled me through all these years to farm sheep, so there is absolutely no reason in these times of dipping tanks and cheap dips, why others should not do the same, unless it is the difficulty in getting the already acclimatised stock, because you can take a sheep to a higher level, but not to a lower. The last few years, from here cross-bred Persian sheep have been sent to several farmers round about, who report most favourably. I would advise Persians or cross-breds for some litle time yet until the ticks have been considerably reduced, when farmers can then turn to the Merino, which, with its worst, will eventually be the most profitable sheep. I feel certain that Messrs. Cooper, Nephews and Co. will also prove the coast belt to be good.

Had our Agricultural Department taken up the matter by an experimental farm, our fair coast region would not have been called hard names, but thank goodness, there exists to-day the healthy tendency to foster our own agricultural resources instead of exploiting the mines and properties of the north. Our commercial men, in the same way are seeing the error of their ways, and are turning from being railway road kurveyors, to help push along the products of the land. We also have a most sympathetic press.

The export of oranges and lemons from these favoured parts will yet be a prominent feature in the East London trade, and help to do away with depression. Mr. Niland, speaking at Grahamstown the other day, said that the benefits of dipping had so impressed him that he had adopted it largely, and had succeeded in getting rid of heart-water from his farm, and had not had a single case for years, and now reared some 1,500 to 2,000 lambs a year, that with cattle he started dipping two years ago, and from that day to this had not experienced a single case of illness. Well, gentlemen, what greater testimony do you want? One requires to be no prophet to see that prosperity will yet return to our coast lands. Taking the present value of coast lands, ranches of cattle and sheep should pay well. Where else can such land, so suitably placed, be bought under 20s. an acre? Knowing something of the country from here to the Zambesi, I say nowhere. To put things in a nutshell: Proper stock, paddocking, dipping, correct time of burning, suitable crops, and efficient management will lead to success.

I leave you to judge which should pay the best, coast land at 20s. or under per acre, or ground inland at the high up-country prices, £3 11s. per acre being paid quite lately for a farm in the adjoining district. Feeling sure that you will endorse what I have said, I hope I have proved my points, and infused into my hearers a little of my love for the coast.

THE FAILURE OF VINES.

The viticulturists of the Cape should be interested in the discussion now proceeding in other countries as to the causes of the failure of vines, which seem to resemble, in some degree, the unaccountable failures noted in this Colony during the past few years. From the *California Fruit Grower* we extract the following article, signed by Alfred Tournier:—

ANAHEIM DISEASE STUDIED BY RAVAZ.

Ravaz, the most prominent authority on viticulture in France, has just published, under the title "Influence of Over-production on the Vegetation of the Vine," a study of a series of cases of weakening and dying of vines in Southern France, Algeria and Tunis. The work includes his personal observations in those countries, and also an extremely interesting study of the California vine disease, so-called Anaheim disease, consisting of a coherent analysis and a new interpretation of the numerous facts which have been reported about this serious affection of the vine.

For the first time positive conclusions are drawn regarding the nature of the disease and the means we have of overcoming it.

It is not without interest to note that Mr. Ravaz supports his conclusions in great part upon a report published in 1901 by Messrs. Bioletti and Twight, and that he has had the constant and active co-operation of the experiment station of the University of California in obtaining information and samples.

Mr. Ravaz considers the question from a particular standpoint of his own, which has brought him lately to effective conclusions regarding many hitherto unexplained cases of dying vines in different countries.

The bunch itself, according to his opinion, must be considered as the most serious drain upon the vigour of the vine. Many persons would be disinclined to admit that the fruit is capable of causing a notable weakening of the tree by which it is produced. However, chemical analysis establishes this plainly. Without discussing this question in full, let us mention a typical case.

At the blooming time suppose we remove all the leaves from a vine, and suppress all the lateral shoots as they appear, so that the vine be deprived of all leaves until autumn. The bunches will not fall, they will develop slowly, colour very late in a very incomplete manner, and develop very little sugar. Their weight will be about one-fifth of the weight they would have reached under normal conditions. Instead of an amount of dry matter corresponding to 30 per cent. of the normal crop, they will contain only about one-fifth of this amount. The quantity of dry matter of normal berries is, therefore, five times as considerable as that of berries weakened in this manner. The difference between the two quantities thirty and six represents the amount supplied by the leaves. Accordingly, bunches take away from the stock four times as much substance as they are able to produce themselves.

What parasite causes such a drain on the vine? Mildew is nothing compared with the bunch; the *phylloxera* is much less grasping, and requires several years to kill a vine. This explains the capital importance this scientist attributes to a proper regulation of the fructification.

The analysis of the above mentioned report by Messrs. Bioletti and Twight on the dying of vines in Santa Clara Valley, imputed by them to over-production and drought, suggested to him that the California vine disease might be due to the same causes, or, rather to only one of them, namely, over-production.

In fact, the differences noted between the California vine disease and the cases in the Santa Clara Valley seem to him of no significance. These differences were given as follows: -

CHARACTERISTICS OF ANAHEIM DISEASE.

Mission more susceptible than Mataro or Zinfandel.

Vines in shade of trees less rapidly affected. Grafting the vines does not save them.

Cuttings from affected vines which shew the disease die as soon as the parent vines.

Rotting of the roots is a constant symptom.

CHARACTERISTICS SHEWN BY DYING VINES IN SANTA CLARA VALLEY.

Mataro and Zinfandel have died more generally than the Mission.

Vines near trees have suffered as much or more than others.

All the recently grafted vineyards are healthy. There are many instances in which cuttings taken during the last two, three and four years from Mataro and Mission vines which are now dead have been planted, or grafted on phylloxera-resistant stock, and have now resulted in vigorous, healthy vines.

Roots of most of the injured vines are sound. But Mr. Ravaz says:—

1. The authors of this report notice in the first place that the same varieties were not equally subject to the disease. But the various varieties do not fructify well simultaneously. A certain variety, very fruitful one year may produce very little another year. In

1896 and 1897 Mataro and Zinfandel might have borne more heavily than Mission. In 1884 the Mission might have been more fruitful than the other varieties.

2. Grafting can only be effective the year of the over-production. Plants already weakened cannot be but still more weakened by grafting.

3. The fact that cuttings taken from weakened vines fail quickly is quite natural; as natural, in fact, as that cuttings grafted on sound roots grow vigorously.

4. The roots on vines which have just died, alone shew signs of injury. Three years after the first cases of death of vines in the Santa Clara Valley the rotted roots had disappeared. On the living vines those only which are sound remain.

To sum up: The characters of the California vine disease, as given by the authors of the report and by various other publications, seem very nearly identical with the cases of dying observed in Tunis, Algeria and France.

A fact shewing well its connection with the production is that vines grafted on roots which tend to small crops have shown a certain resistance, as, for instance, grafted on Lenoir, Champini, Rupestris, St. George, etc.

Numerous proofs favourable to this conclusion are found in Mr. Pierce's work—does not this author keep his attention constantly directed on the relation existing between the disease and over-production? But the way he has interpreted the facts mislead him as to their true and complete significance.

Mr. Ravaz discusses in turn all the facts related by Mr. Pierce with regard to over-production, giving his own interpretation, and finally concluding as follows: According to Mr. Pierce, over-production has evidently taken place among vines which have died subsequently. This fact Mr. Pierce repeats constantly in his study. But he considers it as an "effect," a consequence of the disease, and, therefore, is unable to draw any conclusions of practical utility in the control of the disease.

Suppose we consider this over-production as a cause, and not as an effect. The facts then acquire a very different signification; the disease loses its mysterious character; it ceases to be a bugbear, since we have in our hands the means of attenuating or preventing its effects. It even ceases to be a disease, and becomes a mere condition for which the vineyardist himself is responsible.

Among the facts related in Mr. Pierce's work none of them conflict with this interpretation. On the contrary, most of them justify it better than they do his own interpretation. Mr. Pierce claims that many diseases favour fructification. There is no doubt about this, and the explanation is well known; it is simply due to a weakening of the plants.

Vigorous vines, it is well known, have little fertility; weak vines, on the contrary, are always loaded with fruits. Then the increase of the fructification is not the first sign of the disease it is only the second; even more, it is a consequence of the first, which is the weakening itself.

In the case of the California vine disease, weakening has been noted previous to the over-production. Surprise is expressed by everybody to see vines which have appeared thrifty during one year fail the following spring. Vines in full vegetation, with remarkably healthy, strong and vigorous canes, sometimes lose their leaves little by little in two or three weeks with all the characters of the pretended disease. Mr. Pierce's interpretations do not account in any manner for these facts. The first appearance of the affection always happens on vines too heavily loaded with fruit.

The symptoms are always the same; it is easy to reproduce them; and they have been reproduced at will on a great number of varieties simply by exaggerating the production of generous pruning.

No parasite has ever been found connected with the trouble, and for myself I have not been able to discover anything in diseased tissues, but signs of weakening—of degeneration.

The California vine disease, therefore, is not, properly speaking, a disease at all, and it is useless, to say the least, to make of it a scarecrow for viticulturists and to organise against it such a vigilant guard in all parts of Europe.

Over-production—let us reject the term "California vine disease" —is due to the inexperience of the vineyardists, and it is especially frequent in California because the climatic conditions of that country are remarkably favourable to fructification—conditions which have made California the orchard of the world. To prevent the effects of over-production—first, we must control the fructification as well as the vegetation; second, we must shorten the pruning; third, we may remove the excess of bunches; fourth, and especially, we must not demand a heavy crop from young vines; fifth, we must stimulate the nutrition of the plant by proper irrigation and fertilization.

Regarding the shortening of the pruning, this practice has its dangers; while it may insure normal production in years of abundance, it may cause insufficient production in years unfavourable to the setting of the crop.

Therefore, it would perhaps be better to continue the usual pruning, and practice the thinning of bunches before, or immediately after the blooming, when necessary.

NEW LIGHT ON THE ANAHEIM DISEASE.

Mr. F. T. Bioletti contributes the following to the *Pacific Rural Press*:—In the two works of recent date by Professor Ravaz, of Montpellier, France, a most interesting and encouraging theory has been developed regarding the cause of the California or Anaheim disease, and some closely related troubles of the grape vine.

In the first work, entitled "The Brunissure of the Vine," published in 1904, he shews that all the symptoms of the vine disease known as Brunissure can be produced artificially, simply by causing the vine to over-bear. In the other, entitled "The Effects of Overproduction on the Vine," he attempts to shew, and with great plausibility, that the mysterious death of large numbers of vines in southern France and in northern Africa was due to nothing but over-bearing. He further claims that the death of these vines differed in nothing from that of the vines in the Anaheim region and the Santa Clara Valley of California. He takes up practically the same line of argument used in bulletin 134 of the University of California Experiment Station, published soon after the first appearance of the disease in Santa Clara, and supports it by copious quotation of facts detailed in the writings of all who have studied this mysterious vine disease in California.

Morse, Pierce, and others all agree in noting the occurrence of unusually heavy crops immediately preceding the appearance of the disease. Pierce explains this by considering the heavy crop as a symptom of the disease similar to what is often observed in the case of phylloxera, root rot, etc. In bulletin 134 of the University of California it was first suggested that the heavy crop was in all probability the cause, or one of the causes, of the trouble instead of a symptom. This is the view taken by Professor Ravaz.

Professor Ravaz points out that no disease takes from the vine so much food material as a large crop of grapes, and if the amount of material thus taken equals that produced by the vine, there is nothing left to support the plant, and the vine must suffer, and in extreme cases die. This theory accounts very satisfactorily for the peculiar distribution of the injured vines in cases of Anaheim. Such vines appear sometimes sporadically throughout the vineyard, sometimes confined to certain rows, sometimes to certain varieties, the susceptible varieties differing in different districts, but always being the heavier bearers. The distribution of the injured vines corresponds exactly, in fact, with that of variations in bearing, and not at all with that of vines attacked by any known disease.

The position of Mr. Ravaz would be much stronger, it appears to me, if, instead of considering over-production as the only and sufficient cause of the Anaheim disease, he looked upon it simply as the main or determining cause. While it seems to be true that death from Anaheim disease is always preceded by heavy crops, it is equally true that heavy crops are not always followed by Anaheim disease. In the Santa Clara Valley the heavy crops were accompanied by phylloxera, vine hoppers and spring frosts, and followed by several seasons of insufficient rainfall. No one of these causes could have killed the vines so quickly, or, in fact, at all, with the exception of the phylloxera, and it is probable that death of the vines was due to the simultaneous presence of several of these causes.

While Mr. Ravaz has not yet developed his theory sufficiently to explain all the peculiarities of this dread vine trouble, it is the most plausible theory yet advanced.

It accounts in a very satisfactory manner for a great many of the mysterious deaths among vines, which have been noted throughout California, especially during the last ten years. These deaths have occurred in every section of the State, Sonoma, Napa, Yuba, Marin, Santa Cruz, Alameda, Sacramento, San Joaquin, Fresno, Kings counties have all shewn numerous cases which only differ from those of Anaheim and Santa Clara in the greater severity of the latter. Other cases which differ slightly in the symptoms, such as the "Red Leaf" disease of Sonoma, may be accounted for in the same way by supposing that the contributing causes accompanying over-production are somewhat different. The dying of young vines which have never borne is, at least in part, explained by the weakness due to the use of cuttings taken from vines impoverished by over-production. This emphasizes the necessity of careful choice of cuttings recommended in Circular 26 of this Station.

It should be well understood that the word "over-production" is a relative term. A vine overbears when the grapes take from it so much that insufficient is left to store up as reserve food for the use of the trunk and roots. The more vigorous a vine, the more grapes it can produce without over-bearing. We have then two opposite means of preventing over-bearing. First, reduction of the crop by close pruning, or thinning the fruit, and, second, stimulating the vigour of the vine by good cultivation, complete control of diseases, and the proper use of fertilizers.

THE WINE SHOW.

Analytical Report.

The following is the report of Mr. J. Lewis, M.A., Government Analyst, on the analysis of twenty wine samples of prize wines and one sample of prize brandy exhibited at the recent Wine Show of the Western Province Board of Horticulture, held on Wednesday, the 24th of October, 1906:—

Description of Sample.	Prize.	Alcohol by Volume, per cent.	Proof Spirit per cent.	Extract grms. per 100 c.c.	Sugar grms. per 100 c.c.	Total Acid grms. per 100 c.c	Volatile Acid grms. per liter.	Sulphurous Oxide mgrms. per liter.
Class I.—Hook Type—								
P. & P. Rabie, Nuy	1st	13·45	23·55	2·0836		·500	·503	84·6
W. A. Krige, Stellenbosch	2nd	13·95	24·27	2·3842		·331	·740	69·2
C. M. Neethling, Stellenbosch	3rd	12·80	22·44	2·4512		·463	·723	75·6
Class II.—Sauterne Type—								
Miss E. I. Foster, Lynedoch	1st	14·75	25·85	2·3484		·569	·428	129·4
J. F. du Toit, Vlottenberg	2nd	14 70	25·75	2·3484		·594	·545	97·4
T. J. de Waal ,, ...	3rd	14·45	25·32	2·2392		·546	1·204	47·5
E. Lange, Koelenhof	1st reserve	13·85	24·27	2·5972		·612	·657	64·0
Class III.—Sherry Type—								
H. I. Joubert, Vlottenberg	1st	16·00	28·05	3·2936		·520	·502	187·0
W. A. Krige, Stellenbosch	2nd	13·85	24·27	2·3860		·338	·739	66·7
T. J. de Waal, Vlottenberg	3rd	14·40	25·24	2·3532		540	1·246	46·2
J. H. de Villiers, Durbanville	1st reserve	14·00	24·52	2·5136		·503	·497	53·4
Class V.—Sweet White Wine—								
D. M. le Roux, Paarl	1st	6·67	11·69	46·5500	39·72	·689	1·332	80·7
D. M. le Roux, Paarl	1st reserve	5·25	9·19	57·6000	43·24	·513	1·113	71·8
Class VI.—Claret Type—								
F. Versveld, Klassenbosch	1st	11·20	19·61	2·3240		·552	·660	2·7
High Constantia Estate, Constantia	2nd	12·65	22·17	2·3364		·579	·438	*Nil*
H. Cloete, Wynberg	3rd	13·05	22·88	2·2556		·470	·662	1·4

The Wine Show—Continued.

Description of Sample.	Prize.	Alcohol by Volume per cent.	Proof Spirit per cent.	Extract grams per 100 c c	Sugar, grms per 100 c c.	Total acid, grms per 100 c.c	Volatile acid, grms per liter.	Sulphurous oxide, mgrms. per liter.
CLASS VII.—Burgundy Type—								
L. Cloete, Wynberg	1st	13·10	22·96	2·4974		·500	·888	5·2
E. Lange, Koelenhof	2nd	11·90	20·86	2·5056		·556	·708	12·2
R. W. Boyes, Mulder's Vlei	3rd	14·80	25·93	3·6008		·497	·834	35·0
CLASS VIII.—Port Type—								
G. A. Retief, Lower Paarl . ..	1st	18·61	32·61	5·5300	2·091	·537	·540	11·6
P. & P. Rabie, Nuy	2nd	20·00	35·04	4·7000	1·438	·447	·714	Nil
H. Cloete, Wynberg	3rd	14·71	25·77	2·7952		·622	·840	1·4
CLASS IX.—Sweet Port Type—								
D. M. Le Roux, Paarl	1st	11·28	19·76	26·1300	20·346	·612	2·340	73·8
A. P. Burger, Nuy	2nd	15·70	27·51	25·5500	19·740	506	·948	19·3
CLASS X.—Sweet Red Wine								
D. M. le Roux, Paarl	1st	6·28	11·00	54·0500	47·330	·589	·917	59·0
T. & D. Hugo, Nuy	2nd	17·54	30·76	26·4600	22·590	·384	·288	11·5
A. P. Burger, Nuy	3rd	15·72	27·54	25·6400	19·270	·497	1·027	18·0
CLASS XIV.—Light White Wine—								
P. & P. Rabie, Nuy	1st	13·40	23·47	2·1720		·490	·437	72·0
CLASS XV.—Light Red Wine								
F. Versveld, Classenbosch	1st	11·30	19·79	2·1170		540	·660	Nil
CLASS XII.—Dop Brandy—								
J. Malan, Constantia		51.35	95·00	·1704		·065	·042	

The quantity of sulphate present in these samples was well below the limit of two grams of Potassium sulphate per liter. Many of the samples were badly corked, which may account for the large excess of volatile acid present in some cases. I would therefore recommend that the prizes be awarded to the wines Class V. 1st reserve and Class X. 3rd Prize which are only slightly above the limit.

J. LEWIS, M.A., Analyst

Government Analytical Laboratory,
Cape Town, 28th December, 1906.

WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION.

Record of Eggs laid from 18th June to 31st December, 1906.

Pen No.	Breed.	Pullet No.	Eggs Laid.	Points.	Total per Pen.	
					Eggs.	Points.
1	Buff Orpingtons	1*				
		2	15	30		
		3	12	22		
		4	13	26	279	540
2	Partridge Wyandottes	5	9	11		
		6	8	12		
		7	13	25		
		8	10	16	253	426
3	White Wyandottes	9	14	26		
		10	12	24		
		11	18	36		
		12	11	19	412	784
4	White Leghorns	13	8	13		
		14	21	25		
		15	29	39		
		16	21	32	493	819
5	White Wyandottes	17	17	34		
		18	14	28		
		19	18	36		
		20	11	14	344	625
6	Buff Orpingtons	21				
		22*				
		23	12	24		
		24	13	26	294	582
7	Plymouth Rocks	25	10	19		
		26	12	17		
		27	10	20		
		28	21	36	367	590
8	Buff Orpingtons	29	12	21		
		30	9	13		
		31	12	24		
		32	14	27	269	501
9	Brown Leghorns	33	20	40		
		34*				
		35	11	22		
		36	14	26	331	636
10	Buff Orpingtons	37	13	26		
		38	12	24		
		39	8	15		
		40	11	19	326	622
11	White Leghorns	41	5	9		
		42	15	30		
		43	14	28		
		44	11	22	328	643
12	Buff Leghorns	45*				
		46	20	40		
		47	3	6		
		48*			295	542

*Dead.

Western Province Agricultural Society's Egg Laying Competition—*continued.*

Pen No.	Breed.	Pullet No.	Eggs Laid.	Points.	Totals per Pen.	
					Eggs.	Points
13	Buff Orpingtons ..	49*				
		50	11	20		
		51	17	34		
		52	14	27	338	650
14	Buff Orpingtons ..	53	13	23		
		54	15	22		
		55	8	16		
		56	12	22	359	658
15	White Wyandottes ..	57	22	26		
		58	5	10		
		59	12	22		
		60	8	9	251	412
16	Black Orpingtons ..	61	14	28		
		62	8	16		
		63	11	22		
		64	10	20	301	599
17	Buff Orpingtons ..	65	14	27		
		66	13	19		
		67	13	18		
		68	10	20	261	440
18	White Leghorns ..	69	8	15		
		70	20	40		
		71	20	40		
		72*			382	780
19	Brown Leghorns ..	73	13	25		
		74	18	30		
		75	9	13		
		76	10	20	371	641
20	White Leghorns ..	77	15	30		
		78	15	30		
		79*				
		80	21	38	303	588
21	White Leghorns ..	81	2	4		
		82	1	2		
		83	8	16		
		84	11	20	190	371
22	Buff Orpingtons ..	85	10	20		
		86	10	20		
		87	11	15		
		88	12	18	307	586
23	Buff Orpingtons ..	89	17	28		
		90	15	29		
		91	15	29		
		92			344	648
24	Plymouth Rocks ..	93	16	25		
		94*				
		95	15	17		
		96	16	31	248	374

In scoring, 2 points are given for every egg weighing over 1¾ ounces, and 1 point for every egg weighing 1¾ ounces or less.

* Dead.

AGRICULTURAL SHOW DATES, 1907.

Paarl, on Thursday, January 24.

Stellenbosch on Thursday, January 31.

Worcester, on Wednesday, February 6.

Bredasdorp, on Thursday, February 7.

Aliwal North, on Tuesday and Wednesday, February 12 and 13.

Queenstown, on Wednesday, Thursday and Friday, February 13, 14 and 15.

Malmesbury & Piquetberg, at Malmesbury, on Wed., Feb. 13.

Robertson and Montagu, at Robertson, on Wed., Feb. 13.

Bayville, on Friday, February 15.

Western Province, at Rosebank on Tuesday, Wednesday, and Thursday, February 19, 20, and 21.

Ceres, on Wednesday, February 27.

Riversdale, on Wednesday, February 27.

Caledon, on Thursday, February 28.

King William's Town, on Thursday, February 28 and Friday, March 1.

St. Mark's Agricultural Society, at Cofimvaba, on Friday, March 8.

East London, on Thursday, Friday, and Saturday, March 7, 8, and 9.

Barkly East, Wednesday, March 13. Judging on Tuesday, March 12.

Molteno, on Tuesday, March 19.

Humansdorp, on Wednesday, March 20.

Bloemfontein, on Tuesday, Wednesday, and Thursday, March 19, 20 and 21.

Oudtshoorn, on Wednesday, Thursday, and Friday, March 20, 21, and 22.

Umtata, on Thursday and Friday, March 21 and 22.

Mafeking, on Wednesday, March 26.

Midland Agricultural Society (Graaff-Reinet), on Tuesday and Wednesday, March 26 and 27.

Wodehouse Agricultural Society, Dordrecht, on Wednesday, March 27.

Albert Agricultural Society, at Burghersdorp, on Wednesday and Thursday, March 27 and 28.

Bathurst, Wednesday and Thursday, March 27 and 28.

Butterworth Farmers' and Traders' Association Show, on Thursday, March 28.

Cradock, on Tuesday and Wednesday, April 2 and 3.

Kokstad, on Tuesday and Wednesday, April 2 and 3.

Albany Agricultural Society, at Grahamstown, on Thursday and Friday, April 4 and 5.

Cape Flats Farmers' Show, Wednesday, April 10.

Elliot, on Wednesday, April 10.

Port Elizabeth, on Wednesday, Thursday, and Friday, April 10, 11, and 12.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible.

All letters or contributions should be plainly addressed, "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith. A *nom de plume* may be attached for publication.

Biliary Fever in a Heifer.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—A heifer of two years old recently shewed signs of derangement of the liver. I at once gave her 60 grains of calomel, and 1 lb. of Epsom salts four hours after. She then appeared to be a little better, but did not attempt to feed, so I gave another 30 grains of calomel, and always kept the bowels regular. She always had a high fever. She was fed with one gallon of gruel every day, with 30 grains of calomel at times. She died on the 23rd day.

On having a postmortem, the liver was enlarged, the gall bladder had about a quarter inch of fat all round—it was bedded in fat and almost quite empty. She was not fat, and not in good condition. I have always had good results when treating so called gallsick with calomel. Can you tell me why the calomel did not reduce the liver in this case? There was absolutely no sign of anything else wrong. Last year I lost a year-old calf with the same thing, which had the same treatment. This calf lived for 21 days, but in this case the liver had spots on it which looked as if it had been cooked, the gall bladder being half full.

I would be very thankful if you could give me a quick reply, and advise me what to use, seeing calomel has failed, as I have a cow sick now which is heavy in calf. She took sick three days ago. I at once gave her 60 grains of calomel, and four hours after gave 1½ lbs. Epsom salts. Seeing she was no better the following morning, I gave another 30 grains of calomel. In the evening she was purging so much that I administered two doses each of 1 drm. ext of belladonna, 1½ oz. pwd. ammonia. This morning she was no better, so I gave another 60 grains calomel.

I am very much afraid I shall lose this cow as well.

I shall be very thankful if you would send me a reply of advice at once, as I cannot understand calomel failing in common cases of gallsickness.—Yours, &c.

JAMES R. N. HART.

Harrismith, O.R.C.

The following reply was posted: "I am of opinion that you have been rather too free in the use of calomel and other medicines, not allowing time for nature to assist in the recovery of the sick animals. From your description of the heifer, I am inclined to think that she was suffering from ordinary biliary fever, and not ordinary gall sickness, and should advise you, if you have other cases, that you should, after dosing with calomel and a purgative, give chloride of ammonia in one ounce doses twice daily in water, and, if the animal is weak, a stimulant, say three wineglassfuls of brandy, keeping the patient warm.—(Sgd.) J. D. BORTHWICK, Chief Veterinary Surgeon.

Aloes and Ticks.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have been told by a reliable farmer that "aloes" is a good remedy for ticks in cattle, horses, etc. I daresay this has already been tried where ticks abound, but if not, it might be recommended to farmers, who are troubled by ticks among their herds, through your Journal and thoroughly tested. A dose of aloes is said to make all the ticks fall off in a day or two, and leave the animal immune for a considerable time. The dose is said to be a tea-spoonful of aloes to a cup full of water.—Yours, &c.,

A. S. J.

This belief is firmly held by many farmers, but experiments fail to prove it. The same belief holds as regards sulphur and wild garlic, but has usually failed on test. The only reliable remedy for ticks is the regular dipping of stock in an arsenical dip.

The Lamziekte Controversy.

To the Editor, AGRICULTURAL JOURNAL.

Sir,—In your November issue I note that Messrs. Lanham Bros. are of the opinion that lamziekte is caused by ticks. In your December issue, Mr. W. F Wileman endeavours to pooh pooh the idea by writing nonsense about frogs with broken legs. I can assure Mr. Wileman that a certain form of lamziekte is undoubtedly caused by bush ticks.

Last May I visited a certain farmer in this district, and whilst we were standing talking the herd appeared with a lamb, which he informed us had nenta. The lamb was paralyzed, and on examination I found a bush tick half embedded in the hind quarter. I removed the tick, and the following morning the lamb was strong enough to return to the flock.

About three weeks later a certain farmer in this district, a personal friend, wrote that his sheep were dying daily, described the symptoms, and asked if I knew of any remedy. I drove over to the farm, and on arrival we examined a lamb which the herd had just brought in. The lamb was completely paralyzed. I found two bush ticks in different parts of its body; these I removed, and the following morning the lamb was walking about. We examined several sheep, but owing to the length of the wool were unable to find any ticks. I advised dipping in Cooper's dip, and I quote from a letter I received a few days later: "I did as you advised, and must admit the result was far above expectation. Five sheep were down when we commenced dipping; two more joined them during operations, but the following morning all of them were up, and went to the veld with the flock.—Yours, &c.,

ANGLO-AFRICANDER.

Jan de Boers, 15th December, 1906.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Reverting to our letter *re* "Lamziekte" and with reference to Dr. Hutcheon's remarks thereon:—We have never for a moment confused the disease known in this country as "*Lamziekte*" with the *Paralysis* referred to in the "Encyclopædia Britannica," Professor Williams's "Veterinary Medicine," and some six other works (dealing with cattle diseases), which we have studied. We are *sure* the diseases are not the same, for in the case of the cattle we have lost there has been no gradual "wasting away." The great majority of them have been fat and active, and the very picture of health one day, and a day or two later *down*, and powerless to rise. Yet we imagine there must be some connection between the two diseases, if not, why does bone meal help so much in the case of each?

We may state that many years ago we were farming on the "Kaap" range. Our cattle were dying from "Lamziekte." Dr. Hutcheon advised the use of crushed bone. We tried it, and have used it ever since, and whatever the experiences of other farmers may have been, we can only say that in our case the use of crushed bone (and during the past two years of bone-meal) has saved us many hundred pounds' worth of cattle.

We feel convinced that the disease which attacked our gemsbok, and from which our boer goats sometimes suffer, is identical with that which sometimes destroys our cattle. We will describe a typical case. Some time ago a pet boer goat kid became sick and "limp." We found a large, *soft*, brown tick, and several small, *hard*, brown ticks on the tip of its tail. A few hours later it was unable to stand; it lay about for about 14 days, when it regained some power in the forequarters, and was able to drag itself about. It did not appear to suffer any pain, and would suck greedily when supported, so that it could reach its mother's teat. In about three weeks it had recovered sufficiently to walk. The gemsbok cow we referred to (and in a vulnerable part of the body of which we found partly buried one of those same large, brown ticks we so strongly suspect) was found in the veld four days after she was missed. We could see from certain indications that she had been "*down*" the whole time. She did not seem to suffer at all, and readily ate the green food with which she was supplied. We frequently lifted her, but her legs and back seemed to be paralysed, and she was unable to stand. She gradually recovered strength in her forequarters, and was able, in a few more days, to drag herself about in search of food. In about a fortnight she could manage to walk.

In neither of the cases of "Lamziekte" we have just described did *the part attacked by the ticks* swell in the least—there was no *local* poisoning.

We will now describe the symptoms connected with the last cow we lost from "Lamziekte." In the morning she was unwell, walking with difficulty, and giving one the idea that she was *very* badly "footsore." In the evening she could only with difficulty rise, and the next day not at all. She managed to drag herself about a day or two longer. When lifted, she was too "limp" and helpless to stand. She died ten days after the first appearance of the disease. She apparently suffered no pain until she had been down several days, and she ate up to within three or four days of her death. We had her skinned, and could see little wrong excepting that the "blaar pens" was quite dry and "caked"; the liver and bowels were a little inflamed, and the gall bladder rather distended. But we attributed this to the fact that the animal had been lying down so long. The ticks had not yet disappeared when this cow died.

In most of the cases of Lamziekte we have studied, the disease seemed to have deadened the nerves, and in consequence the animal, to all appearance, suffered litle pain. Another thing we have noticed is that the *hind* quarters (those most vulnerable to the attack of the ticks) always lost their vitality before the front quarters did.

It may be asked why we place such faith in bone meal, when we still sometimes lose an animal from Lamziekte? We reply: Owing to the bad droughts which have prevailed in this country during the past few years we have frequently had to shift our cattle about when it has not always been possible to send the salt troughs with bone meal along with them.

As far as our experience goes, if cattle can be *regularly* supplied with bone they will seldom contract the Lamziekte.—Yours, &c.,

LANHAM BROS.

Mount Temple, December 15

P.S.—We may mention that we have also lost a considerable number of cattle from the disease described by Mr. Donovan in December's issue of the *Agricultural Journal.* We have found the course of this disease to be very rapid, and look upon it as a very virulent form of gallsickness. The P.M. shews a very much enlarged and dark coloured gall bladder, with a yellow tinge about its nick. In these cases the "blaar pens" is not unduly affected either. We have not found that bone meal benefits the cattle for this disease, either as a preventive or cure.

LANHAM BROS.

Mount Temple, December 19th.

Cancer Bush, Tsama, Wit-Gat Tree

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the issue for October last, Mr. J. F. Pentz asks about some shrubs and plants which, like the "Cancer Bush," will supply some succulent green foliage for stock. Well, my experience is that there is nothing better than the valuable Tsama. Very bad grass-veld, as well as poor bush-veld, sown with a sufficient quantity of Tsama will give good results. It should be sown, like any other rank grass, between August and December. Soil suitable for mealies will answer very well for Tsama.

The "Wit-gat Tree" is also worthy of consideration. Every season its numerous berries are devoured by insects, birds and baboons. I have not yet tried to propagate the plant.—Yours, &c.,

J. SCHOLTZ.

Magdala, Oliphants Hoek, 20th November, 1906.

Italian Rye Grass.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Will you please be so good as to let me know what kind of grass the enclosed is. It grew first in a strawberry bed, which had been manured with stable litter (imported fodder being used at the time). All kinds of stock like the grass, and will eat it readily, even when well fed with green fodder. It grows easily from seed. The only danger seems to be that it may spread too much in garden ground, and thus become troublesome. Any information about the grass will much oblige.—Yours, &c.,

P. I. DE WET.

Witmos, December 18, 1906.

The specimen is Italian Rye Grass (*Lolium Italicum*). It is very hardy grass, growing well in good, moist soil, and gives heavy crops. It is excellent feed for milking stock.

Skunks Eating Eggs.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—We have two ducks sitting. After they had been sitting ten days, each morning we would find one or two of the duck eggs carried a short distance from the nest, a hole about the size of a florin on the side of the egg, and all the contents gone. Last Sunday night, I put an empty box over the two sitting ducks, closed the other ducks up in a shed, and put an egg by one of the boxes, with a hole the size of a florin and a little good strychnine stirred into the yokes. Next morning the contents had been drunk out, and we found a very large skunk dead not far from the spot. No more eggs have been interfered with since.

I have never had to deal with the above, but have often been troubled with crows carrying eggs away. I have found that they are better poisoned by making a very small hole in the egg, put a little poison into the yoke, boil it hard, and put it where the crow is likely to take it.—Yours, &c.

C. E. KIDSON.

Table Hill, Dist. Dordrecht, C.C.

Machine Shearing.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I was greatly interested in a letter upon shearing signed by "Persevere" that appeared in your November issue.

Having Merino sheep upon this estate I was also confronted with the great difficulty of getting the sheep successfully shorn.

Finally, I erected a small wool shed, and installed six of Burgon and Ball's shearing machines, motive power being supplied from an oil engine. I then invited a few of the Dutch farmers residing in this district to come and do the shearing, and very soon taught three of them how to use the machines, and although they had never before seen a machine, soon were able to do their fifty to sixty sheep each a day.

I have, therefore, made my shearing a white man's occupation, and these young men now look forward to the shearing as an annual event whereby they can quickly make a little money during a slack period on their farms. I pay £1 per 100 sheep shorn.

It would seem to me that in a woolled sheep country like Cape Colony, with your several well settled districts and various Farmers' Associations, that this shearing difficulty might be solved either by co-operative action upon the part of such associations, or else by private enterprise.

When sheep farming in Queensland I knew of two brothers who invested their money in a portable shearing machine plant, and travelled through certain districts, shearing the sheep of those farmers, who had no wool shed, or else could not obtain shearers. Those brothers took their shearers with them. Perhaps there may be a good opening for one or more of these plants in your Colony, if sheep owners guaranteed to patronise the plant, and so fix their dates of shearing to fit in with one another; then no doubt this work would become a white man's work. Machines are not very costly things, and soon repay for themselves, and if owners installed a few they could make shearing attractive to the white men desirous of employment.—Yours, &c.,

FREDK. E. WIENHOLT, Manager.

Rhodes' Inyanga Farms, Rhodesia.

Death after Castration.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I should be glad of any advice concerning the following case of death of a calf from castration. I castrated an eight-months-old calf by the usual method of simple excision and scraping of the cord. Weather at the time was cool and showery.

Two days afterwards the calf walked stiffly, and was somewhat swollen about the parts operated on, so I opened the sack carefully, and inserted a greased little finger to release any discharge there might be in the scrotum. There was no discharge, however, and no bleeding, so I syringed the scrota out with Condy's fluid, and left the calf. The following day the penis and along the stomach was very much swollen, but the sack was about normal, and contained no discharge. As the calf seemed somewhat constipated, I gave half a bottle of raw linseed oil and a dessert spoonful of laudanum. The following day the swelling had again increased, the calf stopped feeding, and continually kept straining as if it were trying to pass dung or water, and could not. After death I opened the body and found the tissue extending from the fore legs, along the stomach, and almost to the tail, and down the hind legs to the hocks, full of a yellowish fluid.

The scrota contained no discharge, but were much inflamed.

Dung in the large bowel was hardish.

I should be glad to know if I treated the calf wrongly, or what I ought to do in similar cases.—Yours, &c.,

"KNIFE."

Dewetsdorp, O.R.C.

This animal evidently died of blood poisoning. In such an operation there are only two dangers to avoid—the one is blood poisoning arising from dirt, and the other hæmorrhage or bleeding. In this case the knife used may have been dirty or the animal may have picked up dirt in the wound after the operation. The usual method in all operations on animals is to thoroughly cleanse the parts with an antiseptic wash before starting, to use none but sterilised instruments, and every care should be taken afterwards to keep dirt out of the wound.

Beefwood Borer.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Last year I planted about 150 young beef-wood trees, and same grew very nicely, and this year I have several of them turning yellow at the tops, and upon examination find that, in the main stem, a tiny hole bored, and from there upwards the tree dies off. I am enclosing a short piece that has a hole in, and also a tiny insect in same, which I believe to be the cause. Will you please let me know if this insect is the cause, and how I can prevent same? I have looked over several trees, but can't find any insect on the trees until the damage is done and the heart of the tree turning yellow.—Yours, &c.,

FRED. C. BIDDULPH.

Cradock.

The following reply was posted:—The insect referred to in the letter has not been found, but within the piece of beefwood branch was found a dead beetle. The specimen shews that the mischief is the work of a rather common native insect named *Sinoxylon ruficorne*. It is a cylindrical black beetle about a quarter of an inch in length, which from its form might well be popularly known as the "small bullet borer." Some years ago it was reported to be doing serious damage to fig trees in an out-of-the-way place in German South-West Africa, and almost every year there are one or more complaints from places in the east of this Colony of injury by it to wattles of one kind or another. The beefwood is another favourite food-plant. Ten years ago I noticed a good deal of its work amongst the beefwood street trees in Cradock, but in later seasons evidences of the presence of the pest became much less common. Altogether the beefwood is little troubled with insects, and I do not think the temporary presence of this one should discourage anyone from growing the tree. The borer often tunnels a hole all the way around a branch just beneath the bark, and so causes the death of the part above; branches thus girdled also often break from the force of the wind. There is no simple remedy. If the borer is present in wattles close by in large numbers there is little use doing anything at all, but if the affected trees are isolated, it may be profitable to destroy the beetle or its grub-like larva as soon as injury by it is noticed. It might be dug out, killed by the injection of a little paraffin oil, or the affected part may be cut off and burned.—CHAS P. LOUNSBURY, Entomologist.

Carbon Bi-Sulphide for Weevils.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have been asked by Mr. J. N. de Villiers, of Kuils River, to bring to the notice of the *Agricultural Journal* that bisulphide is a certain remedy against weevils and other insects in stored (dry) peas, beans and grain. It is applied in the following simple manner: Put the infected product in a fermenting vat or other like receptacle, not thicker than about six inches at a time, place a quantity of bisulphide in a small tin on the contents at the botom of the vat, cover up the top of the vat well with a skin or sail, and leave it like that for three days, at the end of which time the bisulphide fumes would have entirely destroyed the pest in every shape and form. Yours, &c.,

J. SMUTS,

Secretary Stellenbosch Agricultural Society.

Stellenbosch, December 24.

The Propagation of Paspalum.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have read with great interest the communication in the current number of the *Journal* on the cultivation of paspalum grass in New South Wales, Australia. This grass ought to do equally as well in this country, and I am inclined to think that after reading the account referred to, many farmers will decide to give it a good trial.

I am told by a good many farmers that they have sown the seed, and it has not come up, so they have decided that the seed was bad. I am inclined to think that the fault is not in the seed, but must be looked for elsewhere. About nine months ago, I got a few pounds of seed, but having heard that it had failed with others, I did not take much trouble with it, but mixed it with some rape seed that I was sowing, and it was not until the rape had been eaten off by ostriches that I discovered that the paspalum had come up very well, and was spreading out splendidly, and in some places quite covering the ground. It is now seeding freely. I am so well satisfied that I have treated another piece of land the same way, and intend to try it on a much more extensive scale in the near future. I find that we have a grass, natural to these parts, which rather resembles the paspalum, which grows chiefly about cultivated lands and homesteads.

My method of sowing is to harrow the land after ploughing, sow the seed, and re-harrow.—Yours, &c.,

H. DUGMORE.

Glen Hope, P.O., Martindale, District Bathurst, Dec. 17.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have sown the above seed, according to advice, thickly, like cabbage seed, and only a fraction of it would come up. So I started watering same every other day to force it to come up. On the 18th September, about a month after sowing, the plants commenced to appear, and a week later every seed seems to have germinated. Since then my well got weak, and I could not water it so plentifully. It has since grown very slowly and is only from two to six inches high by this time. It looks a very strong feeding grass, but in this dry district, I fear, it will not answer for a veld grass.—Yours, &c.,

L. J. VOS.

Zwemkuil, Prieska, Decembe 15.

The "Samson" Windmill.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Can any of the many readers of your valued and well-conducted Journal give any information about the "Samson" Windmill? It is advertised a lot, and given out to be four times as strong as any other windmill, but before believing this, I should like to have it confirmed by some farmers who have had it in use. Is the "Samson" a better class of air motor than the others? Can it be placed on towers other than its own? Is it self-governing in a heavy gale? Will it take care of itself when placed in a remote part of the farm without much attendance? Is the self-oiling device reliable? Which size of tower would a practical man recommend? Of course, I know this depends upon the surroundings, but in my case these are uninterrupted. I have a river on my farm and two boreholes, and I intend irrigating from same a plot of ground to grow lucerne.

Thanking in anticipation any of my fellow farmers who may take the trouble of replying to my queries.—Yours, &c.,

STEPHEN A. MCCOMB.

Welcome, Bradford, 22nd December.

Troublesome Weeds.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Per parcels post I send you a weed which threatens to over-run all agricultural lands along the valley of the Vogel River. It is stated to have been first noticed in Coetzeesberg, where the river rises.

It is reported that "dodder" is spreading rapidly in that mountain, and that it thrives well on grass. Can there be any truth in this? If so, it is most serious for the owners of lucerne fields along the river.—Yours, &c.,

N. P. MYBURGH.

Pearston, December 15.

The weed forwarded is identified by the curator of the Herbarium as the "Cockspur," or "Saucy Jack" of Australia—(*Centaurea melitensis, Linn*). It has several other local names, such as "Yellow burr" and "Chinese Burr." It is a native of the Mediterranean, and spreads rapidly in cultivated lands, where it becomes exceedingly troublesome if not checked. To destroy it the best plan is to cut it down as it begins to flower, as it is an annual. It should never be allowed to seed.

RURAL REPORTS.

For the month ending 15th December, 1906.

Aliwal North.—Weather very warm, with good rains. Veld in excellent condition. Fruit trees most promising, likewise mealies. Stock generally doing well.

Barkly West.—Very windy, with light rains, and veld in bad condition. Vines and fruit trees not doing well, and crops very small. Stock in rather low condition.

Bathurst.—Changeable weather with heavy rains. Veld in splendid condition. Fruit trees fairly promising. Good crop of cereals. Stock generally doing fairly well.

Bedford.—Plenty of rain, and veld in splendid condition. Lucerne is growing very well. Stock generally in good condition.

Burghersdorp.—Very changeable weather, with high winds and heavy rainfall. Veld in good condition. Vines likewise. Stock doing fairly well.

East London.—Stormy weather, with occasional high winds, and very changeable in temperature, ranging from extreme heat to extreme cold. The rainfall has been heavy in parts, mostly coastal, and in excess of previous season. The veld is in excellent condition. Fruit trees promising, and vines doing fairly well. Crops somewhat poor and rusty. Cattle and horses doing fairly well. Goats and pigs doing remarkably well.

Fort Beaufort.—The weather has been warm, and the rainfall exceedingly heavy. Veld is in very good condition. Vines and crops looking well. Stock generally in good condition.

Hay.—Windy weather, with heavy rainfall. Veld looking beautiful. Fruit trees and vines looking fairly promising. Crops in good condition. Cattle doing well.

Herschel.—Weather warm, with showers and thunder almost daily. The rainfall has been heavy, and the veld is looking well. Peaches and crops very promising. Condition of stock improving.

Jansenville.—During the last month several very strong gales and thunderstorms have been experienced. Rainfall heavy. Condition of veld improving, and vines and crops doing well. Stock quite satisfactory.

Kimberley.—The weather has been rather windy, with good rains, but the veld is looking rather dry. Fruit trees and vines are promising, and oats are in good condition. Stock generally doing fairly well.

Komgha.—Warm weather, with heavy rains. Veld in good condition, and crops promising. Stock generally doing fairly well.

Ladismith.—The weather has been warm, with light rainfall. The veld is in fairly good condition. Fruit trees, vines and crops are all promising, and stock generally doing fairly well.

Malmesbury.—Very windy weather, with very heavy rains. Owing to the very light rains that fell during the winter the grass is in very poor condition. Wheat crop fair, oats very poor. Very little lucerne. Stock, generally, in fairly good condition.

Middleburg, C.C.—Warm weather, with heavy rains. Fruit trees promising. Very few vines. Crops and lucerne looking well. Stock in good condition.

Molteno.—Favourable weather has been experienced, and the veld is in good condition. Horses and sheep doing well.

Mossel Bay.—Hot weather, with average rainfall. Vines and cereals promising. Stock in fairly good condition.

Oudtshoorn.—Weather hot and windy, with heavy rains. Veld in splendid condition. Very good crops, and the vines and fruit trees are most promising. Stock generally doing well.

Philipstown.—Heavy rains have fallen, and the veld is in good condition. Stock doing well.

Port Alfred.—Mild weather, with heavy rainfall. Veld in very good condition. Fruit trees and vines promising. Good crops. Stock in fair condition.

Prieska.—Windy weather, with good rains. Veld in fair condition. Fruit trees, vines and crops doing fairly well. Stock in fair condition.

Queenstown.—The weather has been changeable, with average rainfall. The veld is looking splendid, but the fruit trees are in very poor condition, the greater number of them having been injured by the acute frost. Cereals not very good, but stock generally doing well.

Riversdale.—Hot and windy weather, with heavy rainfall, and veld in good condition. Fruit, vines and crops promising. Stock looking well.

Robertson.—This district has been visited by very heavy rains during this month, causing considerable damage to vineyards, lucerne, and vegetables. Veld in good condition. Vines doing well except where affected by *Phylloxera.* Fruit trees promising and crops good. Stock doing well.

Somerset East.—Warm weather with thunderstorms prevalent. Exceptionally heavy rains have fallen. Veld looking splendid. Vines, fruit trees and crops doing excellently. Stock in most satisfactory condition.

Stutterheim.—Good rains with warm and sultry weather. Veld in splendid condition. Fruit trees promising. Cereals looking well. Stock generally in fair condition.

Uitenhage.—Good weather, with good rains. Veld in good condition. Good crop of mealies, but oats poor. Stock doing well.

Van Rhynsdorp.—Cold weather, with good rains, and veld improving. Fruit trees doing well, the same remark applying to the few vines which there are in this district. Crops poor, and stock generally in fair condition.

Willowmore.—The rainfall during the month has been very heavy. Strong winds and hailstorms have been experienced, damaging the fruit trees in places. Vines and crops looking well. Stock generally in fair condition.

THE TRANSKEI.

For the month ending 30th November, 1906.

Flagstaff. - The rainfall registered during the past month was 3.81 inches. Rain fell on 15 days. The natives have finished ploughing, and a good crop of mealies and Kafir corn is anticipated. The veld is in excellent condition, and stock of all kinds is in good condition and free from disease.

Lusikeni. — Up to now the prospects of a good grain season are most favourable. Plentiful rains are falling, and the pasturage is excellent.

Matatiele. —About 3½ inches of rain fell during November over a period of 12 days. Pasturage is excellent, and stock of all kinds is in good condition. No diseases have been reported. Ploughing has been freely done by both European farmers and natives. If the favourable weather continues as anticipated, large crops of cereals and oathay will be reaped.

Mount Frere.—Heavy rains fell during the month and considerable damage was done to the crops in parts of the district by severe hailstorms on two successive days, which passed over the lower part of the district taking a zig zag course about five to seven miles wide. The mealie crops that were not advanced are recovering rapidly, but those which were coming into blossom are quite destroyed, as also were the fruit and vegetable gardens in the course of the storm. Happily very little damage was done to stock, only one beast, a few sheep and some pigs being killed by the hail. The veld is very rank and stock are in good condition. There is some good slaughter stock, but very little offering for sale.

Willowvale. — Good, soaking rains have again fallen during the month. The natives in many parts of the district have finished ploughing, the young mealies are coming on satisfactorily, and there is every promise of a good harvest. Pasturage is good, and stock of all descriptions is in excellent condition. Slaughter stock, both large and small, is scarce. Burrweed and other noxious weeds are being dealt with.

NOTES ON THE WEATHER OF NOVEMBER, 1906.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission.

A mean rainfull about one-sixth deeper than usual, deficient in the Western, but considerably in excess of the average over the Eastern half of the Colony, a number of thunderstorms almost double those reported during October, a mean pressure and temperature about the average, skies much cloudier than usual with almost daily fogs, winds stronger than usual with a few gales, a few light, local frosts, and a moderate number of hailstorms, constitute the leading features of the weather of this month.

Division.	Mean Rainfall (1906).	Mean No. of Days.	Average Rainfall (1891-1900).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ..	1·02	5	1·57	6	— 0·55	— 35
South-West ..	0·66	3	0·94	4	,, 0·28	,, 30
West Coast ..	0·30	2	0·32	2	,, 0·02	,, 6
South Coast ..	2·11	10	2·57	7	,, 0·46	,, 18
Southern Karoo ..	0·88	3	1·10	3	,, 0·22	,, 20
West Central Karoo ..	0·96	4	1·04	2	,, 0·08	,, 8
East Central Karoo ..	2·39	6	1·36	3	+ 1·03	+ 76
Northern Karoo ..	3·48	7	1·27	3	,, 2·21	,, 174
Northern Border ..	1·88	7	1·22	4	,, 0·66	,, 54
South-East ..	4·13	12	3·25	7	,, 0·88	,, 27
North-East ..	4 37	12	2·52	6	,, 1·85	,, 75
Kaffraria	4·77	14	3·31	8	,, 1·46	,, 44
Basutoland ..	4·96	12	3·21	8	,, 1·75	,, 55
Orange River Colony	4·44	14	2·23	5	,, 2·21	,, 99
Durban (Natal) ..	3·19	15	5·00	..	— 1·81	— 36
Bechuanaland ..	2·99	11	2·29	6	+ 0·70	+ 31
Rhodesia	6·26	12	3·61	11	,, 2·65	,, 73

Precipitation.—The mean rainfall, as shewn by the records from 344 stations amounted to 2·80 ins. on eight days, being 0·39 in. or 16 per cent. more than the normal. The accompanying table shews a general deficiency of rainfall over the Western portion of the Colony, as well as over the South Coast and the Southern Karoo, ranging from 35 per cent. over the Cape Peninsula to 6 per cent. over the West Coast. Except in Natal, as represented by Durban, where the month's rainfall was 1 81 in. or 36 per cent. below the average, there was a general excess in the rainfall over the North and East, varying between plus 174 per. cent. over the Northern Karoo, and 27 per cent. over the South-East Division. These abundant rains (averaging close on 4 ins. over most of the districts) following on those of October last ought to go far towards rendering agricultural outlook much brighter over the major part of the Colony than it has been since 1901, provided the necessary warmth is experienced during summer. Our observer at Kokstad states that the "country is simply like a flower garden," better even than at the corresponding season of last year. Although, generally speaking, the mean divisional rainfall was considerably less than during October, there was on the other hand a marked increase in the amounts recorded over the Northern Karoo, Northern Border, North-East, Basutoland, Orange River Colony.

Bechuanaland and Rhodesia, over the more inland districts in fact. On analysing the totals for the month it is found that only five (5) stations report "Nil," and only 8 more of the 344 had 1 in. or less; 61 had 1 to 2 ins.; 54 had 2 to 3 ins.; 55 had 3 to 4 ins.; 57 had 4 to 5 ins.; 22 had 5 to 6 ins.; 17 had 6 to 7 ins.; 10 had 7 to 8 ins; the three remaining stations being Insikeni with 9·31 ins.; Kokstad (The Willows) 9·50 ins.; and Evolyn Valley with the largest total of 11·55 ins. One noteworthy feature of the distribution of this month's rainfall is the unusual occurrence of many of the larger quantities over the Northern Karoo, most of those exceeding 6 ins. being recorded at stations in the Northern Karoo, the South-East, North-East and Kaffraria—a most unusual combination of divisions.

Another somewhat remarkable feature is the comparative absence of very heavy falls in 24 hours, the largest amount recorded being only 3·16 at Hope Fountain, near Bulawayo, on the 21st, the next being 3·04 ins. at Cathcart (Gaol) on the 25th. Judging from the following summary of the maximum daily precipitation at 337 stations in conjunction with the fairly large number of "rain days" over the more highly-favoured section, the rains would appear to have been of a comparatively light soaking nature. Omitting the five stations with "Nil," 213 or 63 per cent. had maxima between two and three ins.; these last distributed as follows:—8 over the Northern Karoe; 5 over the North-East; 2 in the South-East; and 1 each in East Central Karoo, Kaffraria, Basutoland and Rhodesia. The remaining two with more than 3 ins. have been already mentioned. *Thunderstorms* were much more numerous and widespread than usual, 682 being reported as occurring on 25 days. These were most general on the 9th and 10th, where they were experienced over practically the whole of the summer rainfall area. The curve shewing their distribution throughout the month increases from the 3rd to the 10th, then decreases much more rapidly to the 15th; a solitary instance was noted on the 18th, but the number reported increase from the 20th to the 24th, decrease till the 29th, and increase once more on the 30th. Associated with these were 53 instances of *Hailstorms* on 17 days of the month. They were most numerous from 9th to 13th, 21st and 25th. Little damage on the whole seems to have been caused by the hail; although the Government Plantations at Kokstad and elsewhere were somewhat seriously affected. *Sleet* was noted at one station on the 18th, but no *Snow*.

Temperature, Cloud and Wind—The mean temperature of all the stations for this month was 64·0°, being the same as the average. Notwithstanding the mean being the same as the normal, the average day temperatures (75·1°) were lower, and the night temperatures (54·5°) higher than usual by the same amount (1·9°), thus reducing the mean daily range to 20·6°, or 3·8° less than the average. Generally speaking, the mean monthly temperature was above the average in the West and South by amounts varying between less than 0·5° and 5°. The excess was greatest (3 to 5°) over the extreme South-West, and decreased slightly northwards, but much more rapidly eastwards, being 0·2° cooler than usual at Port Elizabeth. Except at a few stations at or near the South-East coast, there was a deficiency over the rest of the Colony of mostly 2° to 3°. As nocturnal radiation was practically everywhere less effective than usual, increasing the mean minimum temperature commonly by 1·5° to 3°, this excess was augmented by unusually high mean maxima in the West and South; but in the East the high minimum temperatures were more than neutralised by a deficiency of solar radiation, causing the distribution already stated. The mean warmest station was Kimberley with 71·9°, and the mean coolest Disa Head (Table Mountain) with 57·2°, a difference of 14·7°. The highest mean maximum was 86° at Kimberley, and the lowest mean minimum, 43·4°, at Bensonvale. The warmest day was most generally the 1st, although a fair number of maxima were recorded on the 28th, as also on a few other days. The coldest mornings were most commonly those of the 18th and 19th, although a few of the absolute minima occurred on other dates. The mean of the highest temperatures at each station was 90·3° and of the lowest 43·4°, shewing a mean monthly range of 46·9°. Those temperatures were 2·8° and 5·1° higher than the corresponding values for October. Although the mean maximum for November was 5·3° and the mean minimum 6·3° higher than those for the previous month, there was a marked absence of any very high temperature this month, the highest recorded being 101° at Heldelberg on the 1st, the only other station having a temperature of 100° being Robertson, where this reading was obtained on the 16th. The lowest temperature for the month was 29° at Bensonvale on the 18th, the only instance of a shade temperature below freezing-point. There was thus an extreme range of 72° F. during the month. *Frosts* were reported at 3 stations on 5 days, viz., at Rhodes, from the 14 to the 18th, where vegetables were nipped, and at Mount Fletcher and Fort Fordyce on the 18th.

The mean percentage of *Cloud* was much more uniform than usual over the whole of the stations, ranging from 28 per cent. at O'okiep to 72 per cent. at Port St. John's.

It was least, 30 to 40 per cent over the South-West and West, increasing to about 65 per cent. along the South Coast, whilst inland it was mostly between 45 and 50 per cent., rising to 56 per cent at Hope Fountain. The average for the month was 49 per cent., being 9 per cent. above the normal and 4 per cent. more than last month. *Fogs* or *Mists* were of much more frequent occurrence than during October, 170 instances being reported on 28 days, principally from 2nd to 12th, on 17th and 23rd to 25th. The only days on which these were not noted were the 15th and 20th.

The prevailing morning *Winds* during the month were Southerly to Easterly between the West Coast and Mossel Bay; Westerly to South-Westerly in the Eastern half of the Colony, but Southerly at a few stations inland, and North-Easterly at Kimberley, Winburg and Durban. The mean force of the wind was higher than usual, being 2·01 on the Beaufort scale, corresponding to a velocity of 13·05 miles per hour. Over the Cape Peninsula there was a marked excess of winds between South-East and South-South-West, with a deficiency of those between North and South-West, the mean force at the Royal Observatory being 2·23 (14·15 miles or 2·45 miles per hour more than usual). *Gales* were reported frem 18 stations on 13 days, chiefly on the 9th, 10th and 30th; *Hot Winds* on 1 day and *Duststorms* from 8 stations on 5 days, principally the 7th and 30th. Taken as a whole, harvesting prospects were undoubtedly bright at the close of the month, although rust had appeared in the wheat at Van Wyk's Vlei and Alexandria and notwithstanding the appearance of swarms of locusts over the central portions of the Colony.

OBSERVERS' NOTES.

VRUCHTBAAR.—Very dry month with exceptionally warm days for the month of November. All kinds of fruit and grapes promise heavy yields.

THEEFONTEIN.—Locusts—hoppers—appeared in immense numbers.

THE MEADOWS.—Lovely rains this month. River doing damage to weirs all along its course. Locusts still about in large swarms.

VAN WIJK'S VLEI.—Corn crop being reaped, yield over average. A good deal of rust in crop. Weather unsettled.

ALEXANDRIA.—Crops excellent, except wheat, that has rust in some parts. No prevalent disease.

SUNNYSIDE (ALBANY).—Harvesting somewhat delayed owing to unsettled weather. Other crops growing fast after last few days' warm weather.

CARNARVON FARM.—From all sources we hear that this is a rain record for November. Not for 25 years have such grand rains been known as the 2·63 in. for October and 3·18 in. for November. We here have experienced an extraordinary absence of washaways, all rain penetrated. Enormous quantities of mealies and other late crops have been sown. Though the rain is phenomenal, the average for frosts and wind and cloudless days is below the average. Windy days six, frosts two, cloudless days *Nil.* Messrs. Rudder Bros., of Port Elizabeth, are touring the country introducing "Paspalum" grass and large quantities will be sold this season should the wet weather continue. In bidding November, 1906, good-bye, one can only feel that he has been a good friend.

RHODES.—The frost on the 14th—18th nipped vegetables, etc.

KOKSTAD.—Country simply like a flower garden. More rainfall in District than at station.

GROOT DRAKENSTEIN.—Extremely dry and windy month. Temperature well above the average, both days and nights unusually warm. Mean temperature for month 4·8° above average for seven years. Rainfall for month 0·78 inches below average for 13 years.

KOKSTAD (THE WILLOWS).—Mean barometric pressure below the normal, rainfall considerably in excess of the usual fall at this time of year. Some serious damage was caused by hail in the Government plantations and elsewhere during the month; the fruit crops at these places being practically destroyed. Grass is plentiful and stock well. There has been a case or two of diphtheria in town.

TEMPERATURE, NOVEMBER, 1906.

Stations.	Mean Max.	Mean Min	Monthly Mean.	Abs. Max.	Date.	Abs. Min	Date.
Royal Observatory	71·1	57·4	65·8	86·5	1	51·4	9
Table Mountain (Disa Head)	65·0	49·4	57·2	82·0	28	40 0	18
Sea Point	75·7	56·1	65·9	88·5	28	52 0	8 & 9
Wynberg	74·5	56·6	65·5	86·0	1	49 0	19
Simon's Town	74·7	59·9	67·3	85·0	28	53 0	18
Cape Town (Hospital)	74·6	55·6	65·1	86·6	22	52 0	5, 9, 10 & 13
Blaauwberg Strand	69·2	54·8	62·0	79·5	28	49 9	18
Devil's Peak	69·7	51·7	60·7	89·0	1	42 0	18
Robertson (Govt. Plantation)	83·1	55·9	69·5	100·0	16	39 5	18
Groot Drakenstein	81·5	57·5	69·5	95·9	28	47 3	18
Elsenburg Ag. College	79·8	51·6	65·7	91·7	16	39·3	19
Wellington (Hug. Sem.)	80·9	58·9	69·9	97·0	28	46·2	18
O'okiep	80 0	53·7	66·8	96·1	1	43·7	12
Port Elizabeth	71·0	59 3	65·1	75·0	30	52·0	18
George (Plantation)	70·7	54·8	62·8	91·5	1	45 0	19
Cape L'Agulhas	68·9	59·1	64·0	74·0	28	49·0	19
Heidelberg	80·0	57·2	68·6	101·0	1	41·0	19
Storm's River	71·2	54·3	62·8	92·0	1	48·0	15 & 20
Cape St. Francis	69·4	59·0	64·2	73·0	21, 27 & 28	49·0	18
Amalienstein	83·1	54·9	69·0	99·0	29	42·0	19
Mossel Bay	71·3	59·5	65·4	77·0	1	47·0	19
Murraysburg	79·7	51·8	65·8	97 0	1	30·0	18
Hanover	78·6	51·5	65·0	98·0	1	37·0	19
Kimberley	86·0	57·8	71·9	99·5	1	44 0	19
Sydney's Hope	73·0	53·9	63·4	94·0	1	44·5	19
Cathcart	70·6	49·4	60·0	91·9	1	35·9	19
King William's Town	75·8	56·0	66·1	96·5	1	45·0	19
Evelyn Valley	67·0	50·6	58·8	91·0	1	37·0	18
Stutterheim	73·0	54·0	63 5	95·5	1	43·0	19
East London	70·7	60·2	65 5	78·0	1	53·0	19 & 20
Queenstown	78·1	52·5	65·3	98·0	1	37·0	19
Aliwal North	76·8	52·2	64·5	91·5	1	30·5	19
Rietfontein (Aliwal North)	71 6	50·6	61·1	89·9	1	36·8	19
Bensonvale Institute	73·9	48·4	58·6	87·0	2	29·0	18
Main	72·8	53 6	63·2	97·8	1	39·0	19
Tabankulu	73·2	52 7	62·9	98·5	1	38·8	19
Umtata	75·5	55 9	65·7	90·0	1	42·0	19
Kokstad	72·9	50·8	61·8	92·1	1	35·0	19
Port St. John's	75·4	63·6	69·5	88·0	8	55·0	20
Leribe	73·9	52·4	63·1	87·8	2	40·0	18
Mohalie's Hoek	75·1	49·8	62·4	89·0	3	35 0	19
Teyateyaneng	77·4	48·0	62·7	92·0	2	35·0	19
Kuruman	82·5	54·6	68·5	95·4	4	38·0	1
Hope Fountain	80 9	57·3	69·1	93·9	8	52·0	16
Means	75·1	54 5	64·8	90 8	..	43·4	..
Extremes	..	..	..	101·0	1	29·0	18

RAINFALL, NOVEMBER, 1906.

I. CAPE PENINSULA:

	INCHES
Royal Observatory *(a)* 12 inch gauge	0·55
Cape Town, Fire Station	0·44
Do South African College	0·23
Do Molteno Reservoir	0·56
Do Platteklip	0·69
Do Signal Hill	0·45
Do Hospital	0·36
Do Sea Point (Hall)	0·42
Do do. (Attridge)	0·49
Camp's Bay	0·48
Table Mountain, Disa Head	1·77
Do Kasteel's Poort	2·10
Do Waai Kopje	2·38
Do St. Michael's	2·68
Devil's Peak, Block House	0·91
Do. Nursery	0·75
Do. Lower Gauge	0·88
Woodstock (Hall)	0·66
Do (Municipal Quarry)	0·74
Do (with Nipher's Shield)	0·78
Newlands (Montebello)	0·88
Claremont (Carrigeen)	0·96
Bishopscourt	1·18
Kenilworth	0·77
Wynberg (St. Mary's)	1·40
Tokai Plantation	0·89
Plumstead (Culmwood)	1·06
Muizenberg (Storage Res.)	2·97
Simon's Town (Wood)	1·82
Do. (Goal)	1·55
Cape Point	0·18
Blaauwberg Strand	0·30
Tamboer's Kloof (Monte Vista)	0·55
Newlands Reservoir (No. 1) (450)	1·01
Do (No. 2) (450)	0·81
Woodhead Tunnel (Tbl. Mount.)	1·95

II. SOUTH-WEST:

Eerste River	0·00
Klapmuts	0·87
Stellenbosch (Gaol)	1·01
Somerset West	0 72
Paarl	0·26
Wellington (Gaol)	0·30
Groot Drakenstein (Weltevreden)	0·65
Tulbagh	0·93
Kluitjes Kraal	0·74
Ceres	0·80
Rawsonville	0·32
Caledon	0·03
Worcester (Gaol)	0·64
Hex River	0·61
Karnmelks River	1·30
Robertson (Gaol)	0·65
Do (Govt. Plantation)	0·39
De Hoop	1·59
Montagu	0·46
Danger Point	0·17
Vijgebooms River	1·21
Elsenburg Agricultural College	0·34
Roskeen	0·90
Vruchtbaar	0·44

III. WEST COAST:

	INCHES
Anenous	0 00
Klipfontein	0·16
Kraaifontein	0·00
O'okiep	0·12
Springbokfontein	0 10
Garies	0 05
Lilyfontein	0·27
Van Rhynsdorp	0·11
Clanwilliam (Gaol)	0·61
Kersefontein	0 41
The Towers	0·24
Malmesbury	0·69
Piquetberg	1·12
Zoutpan	0·39
Wupperthal	0·61
Welbedacht	0·00

IV. SOUTH-COAST:

Cape L'Agulhas	0·35
Bredasdorp	0·75
Swellendam	1·63
Zuurbraak	1·17
Heidelberg	0·52
Riversdale	0 75
Mossel Bay	1·50
Great Brak River	0·77
George	2·23
Do (Plantation)	2·21
Woodifield (George)	2·21
Millwood	3·45
Sour Flats	2·38
Concordia	3·57
Buffels Nek	3·45
Plettenberg Bay	1·43
Blaauwkrantz	5·49
Lottering	8·44
Storm's River	6·43
Witte Els Bosch	3·89
Cape St. Francis	1·78
Kruis River	0·94
Uitenhage (Gaol)	1·23
Do (Park)	1·09
Armadale (Blue Cliff)	1·54
Port Elizabeth (Harbour)	1·23
Do. (Walmer Heights)	3·93
Shark's River (Nursery)	1·44
Do (Convict Station)	1·20
Tankatara	1·11
Centlivres	1·23

V. SOUTHERN KAROO:

Ladismith	0·98
Amalienstein	1·04
Calitzdorp	0·00
Uniondale	1 76
Kleinpoort	0·63

VI. WEST CENTRAL KAROO:

Fraserburg Road	0·80
Prince Albert	0·77
Zwaartberg Pass	2·05

I. W. C. KAROO :—*continued*

	INCHES
Beaufort West (Gaol)	2·02
Nel's Poort	0·44
Camfer's Kraal	0·53
Baaken's Rug	0·57
Willowmore	0·99
Steytlerville	0·43

II. EAST CENTRAL KAROO :

Buffels Kloof	1·64
Aberdeen (Gaol)	1·96
Corndale	1·51
Klipplaat	1·55
Winterhoek	1·67
Klipdrift	2·66
Kendrew (Holmes)	1·89
Do	1·38
Graaff-Reinet (Gaol)	1·75
Do (Eng. Yard)	1·84
New Bethesda	2·54
Roodebloem	3 81
Glen Harry	3·78
Bloemhof	4·56
Jansenville	1·63
Patrysfontein	2·96
Roode Hoogte	5·87
Toegedacht	1·80
Klipfontein	1·84
Cranemere	1·12
Pearston	1·59
Darlington	0·75
Somerset East (Gaol)	4·18
Middleton	1·86
Spitzkop (Graaff-Reinet)	3·43
Bruintjes Hoogte	2·66

VIII. NORTHERN KAROO :

Calvinia	0·13
Sutherland	0·34
Fraserburg	0·56
Carnarvon	0·54
Brakfontein	1·16
Victoria West	1·08
Doorskuilen	1·64
Britstown	1·22
Murraysburg	2·01
De Kruis (Murraysburg)	1·82
Richmond	1·67
Hanover	3·79
Theefontein	1·85
Petrusville	3·69
The Willows (Middelburg)	2·59
Middelburg (Gaol)	4·93
Do	4·52
Ezelpoort	6·84
Plaatberg	6·97
Grape Vale	7·80
Roodepoort	7·10
Groenkloof	7·38
Vlakfontein	7·00
Vogelsfontein	7·44
Plaatfontein	6·92
Colesberg	4·11
Fish River	3·07
Varken's Kop	2·11
Droogefontein	2·91

VIII. N. KAROO :—*continued*

	INCHES
Cradock (Gaol)	4·07
Maraisburg	3·44
Steynsburg (Gaol)	4·16
Riet Vlei	3·02
Quagga's Kerk	4·22
Tarkastad	2·02
Do (Dis. Engineer)	2·13
Waverley	2·41
Schuilhoek	2 76
Vosburg	2·04
Zwavelfontein	1·11
The Meadows (Schoombie)	2·70
Cradock	4·62
Gondfontein	4·87
Rietfontein (Div. Colesberg)	3 15

IX. NORTHERN BORDER :

Kenhardt	0·14
Trooilapspan	0·81
Van Wyk's Vlei	1·10
New Year's Kraal	0 92
Dunmurry	3·01
Karree Kloof	1·55
Griqua Town	1·17
Douglas	1·16
Newlands (Barkly West)	2·44
Barkly West	2·35
Bellsbank	1·59
Kimberley (Gaol)	4·09
Do (Stephens)	4·28
Strydenburg	1·72

X. SOUTH-EAST :

Melrose (Div. Bedford)	2·73
Dagga Boer	2·84
Fairholt	2·89
Lyndoch	2·80
Cheviot Fells	2·75
Bedford (Gaol)	3·97
Sydney's Hope	4·01
Cullendale	3·82
Adelaide	2·92
Atherstone	1·63
Alexandria	2·85
Salem	2·93
Fort Fordyce	5·29
Graham's Town (Gaol)	3·27
Heatherton Towers	2·73
Sunnyside	2·91
Fort Beaufort	3·67
Katberg	6·93
Seymour	3·10
Glencairn	6·60
Port Alfred	2·78
Hogsback	6·40
Peddie	2·88
Exwell Park	2·93
Keiskama Hoek	7·12
Cathcart (Gaol)	6·04
Cathcart (Forman)	5·58
Cathcart	5·18
Thaba N'doda	5·28
Evelyn Valley	11·55
Thomas River	3·08
Perie Forest	5·97

X. SOUTH-EAST—*continued*

	INCHES
Forestbourne	5·79
Isidenge	4·97
Kologha	6·14
King William's Town (Gaol)	2·97
Do (Dr. Egan)	2·08
Stutterheim (Besté)	3·58
Fort Cunynghame	4·59
Quacu	4·06
Bolo	2·97
Fort Jackson	2·83
Prospect Farm (Komgha)	3 99
Komgha (Gaol)	4·05
Chiselhurst	3·72
East London, West	2·51
Cata	6·57
Wolf Ridge	6·07
Dontsah	2·92
Mount Coke	2·50
Blackwoods	4·17
Albert Vale (near Bedford)	4 00
Heatherton (Irrigation Works)	2·83

XI. NORTH EAST:—

Venterstad	4·27
Ellesmere	4·04
Molteno	3·62
Lyndene	4·16
Cyphergat	3·96
Thibet Park	2·36
Sterkstroom (Station)	3·43
Do (Gaol)	3·63
Aliwal North (Gaol)	6·33
Do (Brown)	6·86
Carnarvon Farm	3·18
Halseton	3·47
Jamestown	4·28
Whittlesea	4·55
Queenstown (Gaol)	5·21
Do. (Beswick)	5·34
Rietfontein (Aliwal North)	5·66
Middlecourt	2·63
Dordrecht	5·47
Tylden	1·74
Herschel	5·91
Lady Grey	4 63
Lady Frere	3·11
Contest (near Bolotwa)	3·72
Sterkspruit	4·32
Keilands	4·01
Barkly East	4·06
Blikana	5·64
Albert Junction	3 10
Queenstown (Dist. Eng's Office)	5·79
Hughenden	3·49
Glenwallace	3·47
Indwe (Dis. E's Office)	4·13

XI. NORTH-EAST: *Continued*

	INCHES
Bensonvale Inst. (Herschel)	5·29
Cathcart (Queenstown)	5·47
Rhodes	4·74
Aliwal North (Dis. Eng.)	6·72
Lauriston	4·17

XII. KAFFRARIA:

Ida (Xalanga)	4·57
Cofimvaba	3·35
Tsomo	3 78
N'qamakwe	4·06
Main	3·00
Engcobo	3·43
Butterworth	3·16
Kentani	4·90
Maclear	7·75
Idutywa	3·06
Bazeya	6·80
Willowvale	4·98
Mount Fletcher	5·94
Somerville (Tsolo)	2·77
Elliotdale	2·82
Mqanduli	3·60
Matatiele	7·65
Umtata	3·46
Owebe	3·26
Tabankulu	3·82
Kokstad	7·43
Do (The Willows)	9·50
Flagstaff	3·84
Port St. John's	3·52
Umzimkulu	3·84
Maclear (Station)	5·17

XIII. BASUTOLAND:

Mohalie's Hoek	4·04
Maseru	4·47
Teyateyaneng (Berea)	3·75
Qacha's Nek	5·84
Leribe	6·72

XIV. ORANGE RIVER COLONY:

Kroonstad	3·64

XV. NATAL:

Durban, Observatory	3·19

XVII. BECHUANALAND:

Taungs	1·15
Vryburg	2·03
Mafeking	4·17
Setlagoli	3·94
Kuruman	3 65

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 22nd December 1906, ruling at the several centres named, is published for general information:—

CENTRE.	A. Wheat per 100 lb.	B. Wheat Flour per 100 lb	C. Boer Meal per 100 lb.	D. Mealies per 100 lb.	E. Mealie Meal per 100 lb.	F. Barley per 100 lb.	G. Oats per 100 lb	H. Oat-hay per 100 lb.	J. Potatoes per 100 lbs.	K. Tobacco (Boer Roll) per lb.	L. Beef per lb	M. Mutton per lb.	N. Fresh Butter per lb.	O. Eggs. per doz.	P. Cattle (Slaughter)	Q. Sheep (Slaughter)
	£ s d	£ s. d.	£ s d	£ s d	£ s. d	s. d.	s d	£ s. d	£ s. d.	£ s d.	s. d	s d	£ s. d	s d		
Aliwal North ...	0 16 0	0 14 6	0 14 0	0 7 6	0 7 6	10 0	10 0	0 9 0	0 8 0	1/- to 2/-	8d to 9d	6d to 8d	0 0 9	1 9	£9 to £10	21 - to 24/-
Beaufort West ...	0 12 0	0 16 6	0 12 6	0 10 0	0 12 6	10 0	9 6	0 6 0	0 9 0	0 0 10	*6d to 1s	*6d to 7d	0 1 6	1 3	£15	23/6
Burghersdorp ...	...	...	...	...	...	...	...	0 5 0	0 6 0	...	0 11	0 6	0 0 9	1 6	...	...
Capetown ...	...	...	...	...	...	7 0	7 6	0 4 0	0 4 6	...	...	...	0 1 3	1 6	...	...
Clanwilliam ..	11 3to14/-	...	12/ to15/-	...	0 10 0	10 0	10 0	...	0 11 0	0 0 9	7d to 8d.	7d to 8d	0 1 6	1/- to 1/3	...	...
Colesberg ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cradock .	0 9 0	...	...	0 8 6	...	5 0	8 6	0 2 5	0 7 6	0 0 6	...	0 6	0 0 10	1 9	...	...
Dordrecht ..	0 10 0	0 13 0	0 12 6	0 8 6	0 10 6	7 0	6 6	0 5 0	0 6 0	0 1 0	0 8	0 6	0 0 6	1 6	£10	20/-
East London ...	0 12 6	0 12 0	0 11 0	0 6 6	0 10 0	5 6	8 6	0 3 4	0 11 3	1 6	†7d & *9d	†7d & *8d	0 1 3	2 4	£22	37/6
Graaff-Reinet ..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Graham's Town	0 9 0	...	...	0 8 9	...	4 0	7 6	0 4 6	0 6 9	0 0 6½	0 6¼	0 7½	0 1 4	1 4½	...	...
Kimberley ...	0 10 6	0 15 0	0 13 0	0 7 0	0 8 0	8 0	9 0	0 5 6	0 13 0	0 0 7	0 9	0 8	0 1 3	1 6	£11 to £14	18/- to 21/-
King Wm's Town	0 8 0	0 14 0	0 13 0	0 7 0	0 8 0	6 0	7 6	0 3 0	0 6 0	0 0 4	0 6½	0 6½	0 0 10½	1 6	£19	20/6
Malmesbury ...	0 9 0	0 11 6	0 10 6	0 11 0	...	8 5	8 0	0 4 2	0 12 0	0 1 0	0 8	0 7	0 1 3	1 4	£15 10s	£1 5s.
Mossel Bay ...	..	..	...	0 16 6	...	6 0	...	0 5 0	0 10 0	...		...	0 2 0	1 6	...	...
Port Alfred ...	0 10 0	0 16 0	0 15 0	0 10 0	0 10 6	5 0	6 0	0 2 6	0 5 0	0 1 0	0 9	0 9	0 1 3	1 0	...	...
Port Elizabeth ...	0 8 6	...	...	0 7 0	...	3 9	7 6	0 3 0	0 9 0	0 0 3	0 7	0 7½	0 1 6	1 9	...	...
Queen's Town ...	0 6 3	0 11 0	0 6 0	0 6 3	0 6 0	6 3	7 0	0 4 0	0 8 0	0 1 0	*0 6	*0 7	0 0 8	1 0	£12 to £15	20/- to 30 -
Tarkastad ...	0 12 6	0 13 6	0 12 6	0 8 6	0 11 0	5 6	...	0 4 0	0 7 6	0 1 0	*0 7	*0 7	0 0 9	1 0	£12	18/
Vryburg ...	...	...	...	...	...	...	...	...	...	...	...		..	..	...	...
Worcester ...	0 9 0	0 15 0	0 10 6	0 8 0	0 9 0	7 0	7 6	0 3 6	0 4 6	0 0 6	*7d to 9d †6d to 8d	*6d †5d & 5½d	0 1 3	0 10	£10 to £15	22/- to 25/-

NOTE.—A blank space denotes "no transactions. *Colonial †Frozen.

DEPARTMENTAL NOTICES.

Transport of Officers: Department of Agriculture.

It is hereby notified for general information that, from and after the 1st January, 1907, when advice or assistance is asked for by the public from Officers of this Department, the person seeking such advice or assistance must provide free conveyance for the Officer concerned, from the nearest or most convenient railway station or the nearest postal terminus to his place of residence.

D. HUTCHEON,

Director of Agriculture.

Glanders in German S.W. Africa.

PROHIBITION OF EQUINES.

Under and by virtue of the powers and authorities vested in His Excellency the Governor by the provisions of Act No. 27 of 1893, entitled "The Animal Diseases Act, 1893," it is proclaimed, declared and made known that it shall not be lawful, from and after December 3rd, 1906, to introduce, or cause or allow any Horses, Mules or Asses to be introduced into this Colony from German South West Africa, save and except through the Ports of Entry enumerated in Schedule A hereto annexed, and then only provided they are accompanied by a certificate in the form set forth in Schedule B hereto annexed, issued and signed, on a date not more than 14 days previous to such introduction, by a Veterinary Surgeon or other competent or responsible Officer, duly appointed for the purpose by the German South West African Government. Further, the person in charge of such Equines shall be liable, when so called upon, to produce the certificate aforesaid to any Field-Cornet, Police Officer, Justice of the Peace, or owner of land over which such Equines may pass or be passing, and that any Horses, Mules, or Asses which may enter this Colony in contravention of this Proclamation shall be liable to be summarily destroyed without compensation. Every Resident Magistrate, Field-Cornet and Justice of the Peace is strictly charged to see that this Proclamation is obeyed, and to bring to justice any person who may contravene the provisions of the same.

Schedule A to foregoing Proclamation.

PORTS OF ENTRY.

Into Namaqualand:—*Via* Rahmansdrift.

Into Bechuanaland:—

1. *Via* Mooi River.
2. At a point on the Border on Davnignab-Abiquas Aar route.
3. At a point on the Border on Van Roois Vlei and Burghersdam route.
4. At a point on the Border on Ukamas-Nakab route.

Schedule B.

FORM OF CERTIFICATE.

I do hereby certify that the undermentioned Equines have been duly submitted by me to the Mallein test, and have given no re-action, and, further, that they are free from any symptoms of other contagious or infectious disease.

Number and general description of Equines..............................

Place from which travelling..............................

Owner's name and address..............................

Name of person in charge..............................

Place in Cape Colony to which travelling..............................

Signature of Veterinary Surgeon or other responsible Officer appointed by the German Government. } ....

Place.................. ....

Date........................ ....

Free Carriage of Cattle and Ostrich Dips by Rail.

It is hereby notified for general information that the undermentioned Cattle and Ostrich Dips will be carried free on the Cape Government Railways and by road to

(*A*) *Bona-fide* stock farmers who purchase them for their own use;

(*B*) The duly accredited Agents in the Colony of the Importers or Cape Colonial Manufacturers (as the case may be) of such Dips, and all Traders and Storekeepers in the Transkei, Tembuland, East Griqualand and Pondoland, who undertake to retail such Dips at the same prices as charged by the Importers or Cape Colonial Manufacturers;

subject, in each case, to compliance with the following conditions, viz.:—

1. The Dip must be carried from the nearest Railway Station or Port, as the case may be, or otherwise by the usual trade route serving the locality in which the purchaser resides.

2. The Railage and road carriage, the cost of which will be borne by the Government, will be for the *forward* journey only, *i.e.*, from the nearest Railway Station or port, or the usual trade route, as the case may be, to the purchaser's farm, Agent's or Trader's place of business. No cost of the *return* journey or any part of it will be borne by the Government.

3. On delivery to the Resident Magistrate of the District of the Railway consignment note or the receipt for transport or both, and on presentation to him of the seller's invoice or receipt for any of the undermentioned Dips, a refund will be made to the consignee of the railway or transport charges, or both, paid by him: provided that, in the case of Agents or Traders, a written undertaking be previously given to the Resident Magistrate that they will retail such Dips at prices not in excess of those specified in the Schedule hereto.

4. The Railway charges to be refunded will be at the third class rate.

5. The transport charges shall not exceed those usually made to the general public.

The Cattle and Ostrich Dips specified in the Schedule hereto have been accepted as effective Tick-destroying preparations for the purpose and within the meaning of these Regulations, and no other Dip will be recognised as an effective Tick-destroying preparation until a sample is supplied for analysis and a test of its practical efficacy has been made in the presence and to the satisfaction of a Government Veterinary Surgeon.

The prices quoted in the second column are for the period ending the 31st July, 1907.

Government Notice No. 1442*, dated 23rd November, 1906, is hereby cancelled.

D. HUTCHEON,
Director of Agriculture.

Schedule.

Cattle Dip.	Maximum uniform price throughout Cape Colony.	Importing Agents.
Alderson's Cattle Dip.	1s. per lb.	Hamilton Bros., Cape Town.
Demuth's Cattle Dip.	5s. 6d. per gallon ..	Reiners, von Laer & Co., Port Elizabeth.
Fletcher's Albany Tick Dip.	5s. per gallon (1 gal. drums) 4s. 9d. per gallon (5 gal. drums). 4s. 6d. per gallon (10 gal. drums).	G. D. Atherstone, Grahamstown.
Hayward's Sulphur Paste Dip.	55s. per case of 800 gallons (full tick strength).	Hayward, Young & Co., Port Elizabeth.
Little's Cattle Tick Dip.	6s. per gallon	Morris, Little & Son, Port Elizabeth.
Quibell's Paste Cattle Dip.	6½d. per lb.	Stephen, Fraser & Co., Port Elizabeth.
	9d. per lb.	Searle Bros., East London.
McDougall's Cattle Dip.	5s. per gallon	McDougall Bros., East London.

Regulations for Conveyance by Rail of Sheep Dips, Dipping Tanks, Tobacco, Sulphur and Receptacles used in connection with the Dipping of Sheep.

The subjoined regulations having been approved of are published for general information:—

Free Railage within Cape Colony is allowed, subject to the following regulations, for:—

(*a*) Approved Dips, as defined by Government from time to time by notice in the *Gazette*.

(*b*) Dipping Tanks and Receptacles used in connection with the dipping of sheep.

(*c*) Tobacco and Sulphur, which are intended solely for Dipping Sheep.

1. These articles will be carried free on the forward journey only, *i.e.*, from the Coast inland.—

At Cape Town:—

(*a*) for Victoria West Branch, Hutchinson and all Stations South thereof, including Branch Lines; also for Stations on the New Cape Central

At Port Elizabeth:—

(*b*) for Victoria West Branch, Hutchinson and all Stations North thereof to Mafeking on the Western System, including Branch Lines; also for all Stations on the Midland System, including Branch Lines except the Bedford-Blaney Section.

At East London:—

(*c*) for all Stations on the Eastern System, including Rosmead-Stormberg Section, and Branch Lines except the Bedford-Cookhouse Section.

2. For conveyance of any of these articles to or towards the Coast, or to any places beyond the limits mentioned in Regulation 1, application must be made for the special authority of the Director of Agriculture, stating the circumstances under which it is made.

3. Sheep Dips, Dipping Tanks, Receptacles used in connection with the dipping of sheep, Tobacco and Sulphur, manufactured or produced in the Colony, will be conveyed on all Systems and on the New Cape Central Line whether on Forward or Return Journey, without limitation of distance.

4. The cost of rail carriage shall, in the first instance, be borne by the consignor, who, on furnishing the Railway Receipt, will obtain a refund of such cost from the Director of Agriculture.

5. Any person who shall, for any purpose other than the dipping of sheep under the provisions of Acts Nos. 20 of 1894, and 28 of 1899, or of the Scab Regulations for the Transkeian Territories, either (*a*) consign, or (*b*) order the consignment, or (*c*) receive, by rail, under these Regulations any Sheep Dip, Dipping Tank, Receptacle used in connection with the Dipping of Sheep, or any Tobacco or Sulphur, and any person who shall sell or dispose of any [illegible] Dip, Dipping Tank, Receptacle used in connection with the Dipping [illegible] Tobacco or Sulphur, or shall buy or use the same for any other purpose [illegible] such article or articles has or have been conveyed free by rail [illegible] purpose of dipping sheep as aforesaid, shall, in accordance with the Section [illegible] of Act No. 28 of 1899 and Section [illegible] of the Scab Regulations for the Transkeian Territories, be liable on conviction to a penalty not exceeding £20.

[illegible] Charges for Services of Government Veterinary Surgeon.

[illegible]

List of Contractors for Supply of guaranteed Colonial Bone Meal for Stock-Feeding Purposes.

The following revised list of Firms, who have contracted to supply guaranteed sterilised *Colonial* Bone Meal for stock feeding purposes, subject to the conditions specified in Government Notice No. 1354 of 1906, is published for general information, viz.:—

Firm.	Address	Price per ton nett.
Alexander Bros. ..	Broad Street, Port Elizabeth	£8 10s. in 5 tons lots, free on rail, Port Elizabeth.
Brown Bros.	Glen Avon, Somerset East	£7 15s. in 5 tons lots, free on rail Somerset East.
Wright Bros.	Highlands, near Grahamstown	£10 10s. free on rail, Highlands.
F. J. Gietzmann ..	Froude Street, Kimberley	£7 15s in 5 ton lots, free on rail, Kimberley.
R. Wilson, Son & Co. ..	Hout Street, Cape Town	£10 nett, per tons, free on rail, Cape Town.

D. Hutcheon,
Director of Agriculture.

Vermin Destruction.

It is hereby notified for general information that from and after the 1st day of January, 1907, and until further notice, the payments hitherto made for the production of proofs of vermin destroyed will be discontinued.

D. Hutcheon,
Director of Agriculture.

December 19, 1906.

Cyanide for Fumigation.

It is hereby notified for general information that from and after the 1st day of January, 1907, Cyanide of Potassium will be obtainable at the depots mentioned in the Schedule hereto at a cost of 1s. (one shilling) per pound, subject to the restriction that the Cyanide shall be sold only to such persons as intend to make *bona fide* use thereof for the purposes of orchard fumigation, except in such cases as may be sanctioned by this Department.

D. Hutcheon,
Director of Agriculture.

December 19, 1906.

Schedule.

List of Depots:—
East London, The Civil Commissioner.
Grahamstown, Messrs. C. J. Stirk & Son.
Port Elizabeth, The Civil Commissioner.

Railway Rebate on Oil used as Fuel for Irrigation purposes.

As it is evident that the use of oil engines for pumping purposes in connection with Irrigation is likely to be largely extended, and as it is believed that in many portions of the Colony this method of work has great future possibilities, the Commissioner of Public Works has under consideration proposals for fixing a special rate on the Cape Government Railways, for the carriage of oil to be used solely as fuel in connection with irrigation in the Cape Colony.

Arrangements of this character are provided for in Section 111 of the Irrigation Act, No. 32 of 1906.

This would appear to be a convenient opportunity for removing some misapprehension which appears to have existed in the past in respect to the operations of P.W.D. Notice No. 949 of 1904 and Railway Notice No. 2 of 1906.

(1) REBATE ON MATERIALS P.W.D. NOTICE NO. 949 OF 1904.

(1) At the present time, under Government Notice No. 949 of 1904 a rebate is obtainable on the carriage of *materials* such as cement, water pipes, valves, sluice gates, etc., when required for irrigation purposes, and upon *such other materials* as may in the discretion of the Government be admitted from time to time as necessary for the construction or enlargement of irrigation works.

Applications for this rebate should be addressed to the Secretary for Public Works.

This rebate is granted upon certain conditions, which include a sworn statement from the farm owner to the effect that the articles embraced by the application for rebate have been *actually embodied* in a certain work.

The rebate granted is the difference between the South African produce rates (classified C) and the normal or ordinary Cape Government Railway rates for the particular articles in question as specified from time to time in the Railway Tariff Book.

(2) REBATE ON PLANT AND MACHINERY RAILWAY NO. 2 OF 1906.

(2) The Railway Notice No. 2 of 1906 referred to (see also Clause 90, page 82 of the Railway Tariff Book) applies only to the conveyance of *Irrigation Machinery and Plant.*

On such declaration being made the rate charged for the conveyance over the Cape Government Railways is "2d." for Imported articles, and "3rd class" for articles of South African manufacture and is only granted when the consignment is accompanied by a declaration from the consignor or ultimate consignee as the case may be, that the *machinery* or *plant* is actually *to be used* for irrigation purposes in the Cape Colony or in Rhodesia.

The prescribed declarations should be handed in to the local Traffic Manager at the point of consignment.

FURTHER SPECIAL CONCESSION.

To the foregoing concessions for the encouragement of Irrigation it is now proposed to add a special rate for the carriage of oil for use in the Cape Colony only and the procedure proposed is that the Railway Department shall in the first instance carry consignments at the ordinary normal 3rd class rate provided that each such consignment is accompanied by a Declaration from the Consignor or Consignee in terms of the subjoined Form A.

Subsequently rebate of one-half of the rate paid will be made to the consignee upon submission of a certificate (see subjoined Form B) and upon such other evidence as the Commissioner of Public Works may require, that the oil has been actually consumed solely as fuel for purposes of irrigation.

As the first step towards the introduction of this system of Rebate a list will be compiled of all land owners and irrigators using oil engines for the raising of water applied to purposes which legitimately constitute "Irrigation" of land for farming purposes.

Registration upon this list will be contingent upon compliance with such conditions as the Commissioner of Public Works may define after investigation of the facts of each case through the Civil Commissioner of the District and by other means.

Persons desiring to be so registered should communicate with the Civil Commissioner of their Division and furnish the particulars shewn on form C subjoined, as to the class and power of any oil engine, in respect to which application may be made; as to the number of morgen of land estimated to be irrigated by means of such oil engine; and the other details indicated.

Upon this information an estimate will be compiled of the quantity of oil likely to be consumed annually by each engine and for this quantity each owner will be entitled to claim rebate of railway carriage under such Regulations as may be issued from time to time.

All applications for rebate must be supported by the Railway receipts for the amount of carriage originally paid at the 3rd class rate on each consignment and a sworn statement that the oil has been actually used for fuel for the purpose of irrigation will be required.

Pending decision as to the Conditions to be finally adopted, the Commissioner of Public Works will be glad to consider suggestions in respect to the above arrangements from practical irrigators and others interested.

A

Declaration of Consignor by Railway.

I certify that the oil described in the attached consignment note, which has this day been delivered at.... ....Station for conveyance to..................................Station for account of............. ....of the farm..................................in the Division of ....is actually to be used solely for purposes connected with land Irrigation from Pumping Engine of which the said ....is the registered proprietor, and I hereby tender the said oil for conveyance under the conditions prescribed by Government Notice No.......

B.

Declaration of Engine Owner when applying for Rebate.

Division of..........................

I, ... of ...., Ward ...., Division ...., do hereby certify and solemnly and sincerely declare that the quantity of oil specified in the accompanying railway receipt (or receipts) for carriage paid has in terms of Government Notice No. .... been actually and wholly used in connection with the operation of Registered Pumping Engine No. .... for the purpose of land Irrigation on my farm .... in the Division of .. .., and I make this solemn Declaration conscientiously believing the same to be true and correct in all particulars.

Signature of Applicant.

Date .. ..

Declared before me .... this day of ...., 190...

Resident Magistrate.

C.

Schedule of Main Head of Information to be furnished by Owners of Engines, when applying for Registration of their Pumping Plant.

1. Fiscal Division ....
2. Name of owner ....
3. Name of farm ....
4. Description of Plant ....
5. Area proposed to be irrigated ....
6. Existing area under irrigation (if any) ....
7. Additional area (if any) to be brought under cultivation by pumping plant in respect to which application is made ....
8. Classes of crops to be irrigated ....

Applications for Agricultural Employment.

Louis A. Lauder, 2, Rowlands Cottages, Klipper Road, Newlands, Cape.—Employment wanted in dairying or general farm work. Understands treatment of cattle and horses, also of livestock generally, together with land cultivation. References good. Age 41. Married; two children.

J. G. D. Rex, Barroe Station, Steytlerville:—Age 59. Married. One child Twenty years experience in Sheep and Goat farming. Understands livestock generally. Desires management of Farm or Dairy, or other farm work. Wife understands management of poultry.

Wanted position on a good stock farm as assistant or under-manager; applicant has had year-and-a-half's experience on Eastern Province stock farm, would be satisfied with board and small salary, or grazing for stock. Satisfactory testimonials, age 26, unmarried.—Reply to C. D. P.O. Box 61, Grahamstown.

Charles J. Veitch, Goudfontein, P.O. Roodehoogte, Middelburg: Young apprentice wanted for general farm work. Mixed farming, agricultural and live stock, but principally small stock. References as to respectability are requisite, as apprentice will live with family. Must be prepared to work. No salary first few months, after that by mutual arrangement.

E. J. G., of Balfour, has a knowledge of tobacco culture, and would employment on a farm where that crop has never been tried. Would be pleased to learn something of stock. Good references.

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town. Members of Farmers' and Fruit Growers' Associations applying for same through the Secretaries of these Associations are supplied free of charge.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V of *Agricultural Journal.*

Artificial Grasses and Fodder for Stock; Ensilage; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry; Locusts and their Destruction; Possible New Industries for Cape Farmers; Stock Farming; Dairying; Fruit Culture (6d.)

Agriculture.

Wheat Production in Australia (1s. 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s. 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A. W. Heywood; *Brak Land in Relation to Irrigation and Drainage (1d.); The Velvet Bean (1d.); Potato Disease (1d.); Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d.); Sundry Forage Crops for trial in Cape Colony (1d.); Poultry in South Africa: Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.); Tobacco Culture by P. Bornemisza (1d.); The Cultivation of Tobacco in the Colony by K. Schenck (3d.); Tobacco Wilt in Kat River Valley (1d.); *The Process and Appliances for the Flue Curing of Tobacco. (3d.)

Dairying.

Dairy Breeds by A. C. Macdonald (9d.); *Dairy Industry in Great Britain by A. C. Macdonald (6d.); *Dairy Industry in Denmark (2d.); Ready Reckoner for Cream Testing (1s.); †Dairy and its products by D. Hutcheon (2d.); *Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.); Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d.); *Codling Moth (1d.); Fruit Fly (1d.); Fumigation Supplies (1d.); Insect Friends and Foes (1d.); Methods of Locust Destruction (1d.); *Peach Yellows (1d); Pear Slug, Paris Green (1d.); Remedy for Mestwurmen (1d.) *Spray Calendar (1d.); *Spray Pump Notes (1d.); Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d.); Tree Fumigation in California (1d.); Winter Spraying (1d.); Wattle Bag Worm (1d.); Bordeaux Mixture (1d.); Deaths Head Moth Superstition (1d.); Fumigation under Box Covers (1d.); The House Fly (1d.); New Oak Tree Pest (1d.): Nursery Inspection and Quarantine Bill (1d.); Oil Water Pumps (1d.); The Plague of Ticks (1d); Potato Tuber Moth (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d.); Gall Worms in the Roots of Plants (1d.); The Fruit Fly,* (with coloured plates) (3d.); Another Introduced Scale Pest (1d); Washes for Red Scale (1d.); Fruit Fly: Peach Fly (1d.); Lime-Sulphur-Salt Wash for Scale Insect (1d.); The Fruit Moth (1d.); Fusicladium of the Apple and Pear (1d.); Mealie Stalk Borer (3d.)—*coloured plate*: Cleaning up Nursery (1d.); Natural Enemies of the Fruit Fly: Report on Investigations in Brazil (1d.); Locust Birds and Locust Poison (1d.); The Brazil Fruit Fly Parasites (1d.); Cyanide Gas Remedy for Scale Insects (3d.); Arsenate of Lead (1d.)

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d.); †Elementary Principles of Sylviculture or Woodcraft (1d). National Forests (1d.); Indigenous Timbers of the Cape (1d.); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.); Tree Planting for Farmers (1d.)

NOTE.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d.); Portable Floating Hatching Box for Trout Ova (1d.) The Protection of Trout (1d.); The Ocean and its Resources (1d.)

Horticulture

Fruit Culture in the Gamtoos River Valley (1d.); *Marketing of Fruit (1d.); Manual of Practical Orchard Work at the Cape (6d.); The Olive at the Cape (2d); Tomatoes and Fruit for Export (1d.); Citrus Culture in Cape Colony: Report of the Citrus Commission (1d.); *Fruit from Orchard to Buyer (1d); Netting for Fruit Trees (1d.); Fruit Culture in Argentina (1d.); Vegetables for Exhibition (1d.) Chrysanthemum Rust (1d.)

Veterinary and Animal Industry.

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d.); *Heartwater (1d); *Malarial Catarrhal Fever of Sheep (1d.); *Preventive Vaccination against Anthrax and Swine Fever (1d.); Rinderpest: Dr. Koch's Report (1d.); *Inoculation against Rinderpest (1d.); Dr. Kohlstocks Report on Inoculation for Rinderpest (1d.); *Redwater, Texas Fever or Tick Disease (1d.); *Redwater, Anthrax and Quarter Evil (1d.); *Sheep and Wool (1d.); The Eye and its Diseases (1d.): Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.); Tick Heartwater Experiments (1d.); Indigestion and Diarrhœa in Calves (1d.); Persian Sheep and Heartwater (1d.); Poisoning of Stock (1d.); Retention of the Fœtal Membrane, or Afterbirth in Cows (1d); Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d.); Tuberculosis and the Use of Tuberculin (1d.); African Coast Fever with Description of Dipping Tank (3d.); *Rinderpest in South Africa (3d) by D. Hutcheon; *Fluke or Slak in Liver of Sheep (3d.)—*coloured plate*; *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.); Osteo Porosis (3d.)—*coloured plates*; *Glanders (3d)—*coloured plate*; *Animal Castration (1d.); *Preventive Inoculation for Redwater (1d.); *Abortion in Cattle (1d.); Treatment for Worms in Domestic Animals (1d.); *Lungsickness of Cattle, Contagious Pleuro-Pneumonia, or Pleuro-Pneumonia-Bovum-Contagiosa (1d.); *Swine Fever, Hog Cholera or Pig Typhoid (3d.)—*coloured plates*; *Castration of Females and Animals other than the Horse (1d.); Poisoning of Horses by *Ornithogalum Thyrsoides* or Chinkerinchee (*coloured plate*) (3d.); Diseases of the Horse and their Treatment (1s.); Horse Sickness by D. Hutcheon (2d.); Ticks and African Coast Fever (1d.); Cirrhosis of the Liver in Stock (1d.); Liver Disease among Calves (3d.); The Arsenite of Soda Dipping Mixture (1d.); *Lampas.

Viticulture.

†Reports on Viticulture (3d.); *Reconstitution of Phylloxerised Vineyards (1s.); Report on Failure of Hanepoot Grapes on American Vines (1d.); The Making of Wine and its By-Products (6d.); How to Treat Wine Casks (1d.); Failure of Vines (1d.); Manufacture of Dry Wines in Hot Countries (3d.)

Miscellaneous.

Game Seasons (3d.); Land Laws of Cape Colony (1d.); †Monsonia; the Cape Cure for Dysentery (1d.); *Rainfall of South Africa (1d.); Sand Dunes of Gascony (5d.); The Metric System (1d.); South African Stud Book, Constitution, Rules, &c. (1d.); Bars in Ostrich Feathers (1d.); *Information regarding the Mining Laws. (1/-.)

NOTE.—All those marked with * are obtainable in Dutch and English,
† Dutch only.

R. MÜLLER, 77, STRAND STREET, CAPE TOWN,

Pays HIGHEST prices for—

WOOL, OSTRICH FEATHERS,
MOHAIR, SKINS, HIDES.
and other PRODUCE.

R. MÜLLER, Cape Town,

Supplies Best MERINO RAMS and EWES.

Bankers: African Banking Corporation.

P.O. Box No. 133. Telegrams: RELLUM, Cape Town. Telephone No. 180.

R. MÜLLER,

77, Strand Street, CAPE TOWN.

Wall Papers! Paints!

The most artistic selection in South Africa to select from. Wall Papers, Lincrusta Walton, Anaglypta, Papier Mache Cornices, Centres, etc.

White Lead, Paints, Oils, Varnishes, etc.

All goods warranted best quality. Lowest market prices.

Sole Agents for **DURESCO** the famous Washable Distemper, better than Oil Paint on new plaster, and specially suitable for Farm Buildings. Will stand storm or sunshine.

Samples and Price Lists on Application.

SMYTH & CRAWFORD,

35, Wale Street, CAPE TOWN.

One Door above Loop Street.

THE PRODUCE MARKET.

PORT ELIZABETH.

Messrs. John Daverin and Co. report under date December 21:—

Ostrich Feathers.—The market was fairly well supplied this week with the usual average assortment. On Monday, competition was keen, and extreme prices were paid for all descriptions, but on Tuesday and Wednesday the demand became less active, and prices ruled in buyers' favour. The total quantity sold on the market realized £8,773 10s. 3d., and weighed 3,987 lbs. 1¾ ozs. Only very litle business was done out of hand. Owing to the holidays, there will be no market until the 7th of January, 1907.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Primes: Extra super	Special Prices.						Blacks: Long	3	10	0	5	0	0
Good to super	12	0	0	15	0	0	Medium	1	12	6	2	15	0
Whites: Firsts	8	0	0	12	0	0	Short	0	10	0	1	0	0
Seconds	6	0	0	8	0	0	Wirey	0	1	0	0	1	0
Feminas:							Floss	0	6	0	1	10	0
Thirds	3	0	0	4	10	0	Drabs: Long	1	15	0	3	0	0
Super	9	0	0	13	0	0	Medium	0	12	6	1	0	0
Firsts	5	10	0	8	0	0	Short	0	2	6	0	6	0
Seconds	4	0	0	5	0	0	Wirey	0	0	6	0	1	0
Thirds	2	10	0	3	0	0	Floss	0	6	0	1	10	0
Greys	4	10	0	6	10	0	Spadonas: Light	1	5	0	4	10	0
Fancy	5	10	0	8	0	0	Dark	0	10	0	1	15	0
Tails: White	1	10	0	3	10	0	Chicks	0	0	3	0	1	6
Light	0	17	6	2	10	0							
Coloured & Dark	0	5	0	1	2	6							

Wool.—This market remains steady, and a fair amount of business has been done in the open market during the week at full prices for all well-conditioned lots; but heavy and wasty wools were difficult to sell except at low prices. The most important transactions in this market during the week were again our sales of 1,100 bales, amongst which was a fine clip of 74 bales from the well-known flocks of Mr. G. A. Whitehead, of Olivewoods, Bedford, for which we obtained the extreme price of 10d. per lb. This clip was well-grown, superfine in quality, and very carefully got up, and the price obtained is the highest figure paid for a Bedford wool for many years. On the public market yesterday, a fairly large quantity was offered, chiefly consisting of heavy and wasty lots, for which there was little competition, the bulk being withdrawn at low bids.

	d.	d.		d.	d.
Snowwhite, Extra Superior	19½	20	Grease, Short, faulty and wasty	5	5¼
Do. Superior	17½	19	Grease, Coarse and Coloured	4½	4½
Do. Good to Superior	16½	17	Scoured, Coarse and Coloured	6½	12
Do. Inferior Faulty	16	16½	Basuto Grease, short	6¼	6⅝
Grease, Super long, well-conditioned, Grassveld grown (special clips)	9½	10	O. R. C. Grassveld Grease, long and well-conditioned (special clips)	7	7½
Grease, Super Long, well-conditioned, Grassveld grown	8	9	O. R. C. Grassveld Grease, long and well-conditioned	6½	7
Grease, Super Long, well-conditioned, Karoo grown ((special clips)	7½	8	O.R.C. medium grown, grown, light, with little fault	6	6½
Grease, Super Long, well-conditioned, Karoo grown	6½	7	O.R.C. short, faulty and wasty	5	5¼
Grease, Super Long, well-conditioned, Mixed Veld	5¾	7	O.R.C. Karoo grown, long and well-conditioned	6¼	6¾
Grease, Light, faultless, medium, Grasveld grown	6	7½	O.R.C. medium grown, light, with little fault	5	6
Grease, Light, faultless, medium, Karoo grown	5¾	6¼	O.R.C. short, faulty and and wasty	4½	5
Grease, Light, faultless, short, Karoo grown	5½	5¾			

Mohair.—The market continues very quiet, and the amount of business done in the open market during the week has been very small. We hope, after the turn of the year to see more enquiry, and improved prices for the summer clip. On Tuesday's public market a large quantity was offered, but there was little competition, and the bulk of the offerings were withdrawn, owing to low bids. Our London agents, writing under date the 30th November, report as follows:—"Brokers tell us there can be no doubt that a good many orders have been placed for yarns recently, and spinners are not only fairly well employed, but they believe are obtaining remunerative prices. Spinners, however, are aware that the stock of raw material is large, especially on your side, where it is reported about 6,000 bales exist. They, therefore, feel they need not be in a hurry to buy. This appears to be the explanation of the 'hand-to-mouth' policy which they are now adopting, but as their stocks are undoubtedly in very small compass, it seems probable that any decided improvement in the consumptive demand would force their hands, and compel them to operate more freely. So far as it is possible to judge, brokers do not think prices will go lower, but at the same time they consider there is not much reason to anticipate an advance."

	d.	d.
Super Kids, nominal .. .	18½	19
Ordinary Kids, nominal ..	16	17
Superior Firsts, (special clips), nominal	15	15
Ordinary Firsts, nominal..	14	14½
Short Firsts, nominal	13	13½
Superfine Long Blue, O.R.C. Hair	14	14½
Mixed O.R.C. Hair (average)	11	12

	d.	d.
Mixed O.R.C. Hair, very mixed	10½	11
Seconds and Grey	8	9
Thirds	6¾	6¾
Winter Kids (special clips)		14½
Winter Kids (good ordinary)	13	14
Winter Hair	11	11½

Skins.—Sheepskins sold this week in bundles, at 7¼d. per lb.; Pelts, 6¼d.; Capes, 2s. 4d. each; damaged, 9d. each; Goat, 14¼d.; damaged, 6½d.; Angoras, 9¼d.; Shorn, 6½d.; damaged, 4½d. per lb.

Hides.—Sundried sold at 9¾d.; damaged, 6¼d. per lb.; drysalted, 8⅜d.; damaged, 5¾d. per lb.; Madagascar hides, 7d.; damaged, 5½d. per lb.; Thirds, 3½d. per lb.

BREEDERS' DIRECTORY

AND GENERAL FARM NOTICES.

Notices under this heading are inserted at the rate of one penny per word per issue; minimum charge 2s. 6d. Payment must accompany order. Six consecutive insertions 10% discount; twelve 15% discount. Cheques and P.O.O. to be made payable to the Accounting Officer, Department of Agriculture, Cape Town.

HORSES.

Hugh A. Wyndham, Kromdraai Stud, near Standerton, Transvaal. Stud Stallions, Season 1906-1907. Broxton, d.b.h., 15-3. He is very well bred, being by Ayrshire, winner of the Derby, out of Farewell, winner of the 1,000 guineas, by Doncaster, winner of the Derby, out of Lily Agnes, dam of Ormonde, winner of the Derby, her dam Polly Agnes by the Cure—Miss Agnes by Irish Birdcatcher. Thoroughbred mares, £10 10s.: limited number of approved mares, £5 5s.

Narhillah, ch. h., 15 hands, by Baliol, out of Little Nell, by Lammermoor. He won several steeplechases in England, and ran seventh in the Grand National in 1904. Thoroughbred mares, £7 7s.; approved mares, £3 3s.

CATTLE.

HEREFORDS.

Young bulls for sale, sired by "Chain Armour" ("Armour Plate," 19838,—"Patience"). First prize winner Port Elizabeth and East London Shows, 1905-1906. Mr. B. Webb, Arundel Stud Farm.

JERSEYS.

Thoroughbred Herd. Celebrated Island bred bull "Clove," and several of the best cows and heifers from Mr. H. W. Struben's late herd.—Mrs. A. A. Dunn, De Tuin, Piquetberg.

FRIESLANDS.

Pure Frieslands. Enquire for cows, young bulls, and heifers. Oldest pure herd in Eastern Province. Grand milkers. Prize stock. Also, Colonial Rambouillet Flock Rams, limited number.—F. F. Wienand, Bellevue, Bedford, C.C.

R. Cross, Hillside, P.O. Bolotwa. Will have high-class Friesland bulls for sale from February next. Herd may be seen by appointment. Bulls from Imported and Colonial Cows.

Cattle—*continued.*

DEVONS.

Varkens Kop Herd of Pedigree Devons, quality, size, rich milk, very hardy, many prize winners. Cows, Heifers and young Bulls for sale. Ostriches, bred from best strains in South Africa; pairs for sale. Horses, "Typical South African Breed," untrained colts for sale. W. R. Southey, Varkens Kop, Schoombie, C.C.

SHEEP.

MERINOES.

T. T. Hoole, Atherstone, Albany Breeder of PURE GLENGALLAN PEDIGREE MERINOES. Late imported. *King Billy 39th.* Grand Champion. Champion and First, National Association, Brisbane, 1904. First Prize, family group and winner of ten other first prizes.

A. H. Murray, Portlock, Graaff-Reinet. Breeder of Rambouillet Sheep. Good combination of mutton and wool. Rams for sale from £3. Orders now booked for past season's lambs, to deliver 1907.

Rambouillet Rams, from Colonial Ewes, by Imported and Colonial sires. Sold at all Bedford Ram Fairs. Partridge Wyandottes and Indian Runner Ducks' Eggs.—Pringle Bros., Glen Thorn, P.O. Linton, Adelaide.

R. Pell Edmonds, Ripplemead, Dohne, Breeder of Pure-bred Pedigree Merino Sheep and Pedigree Black Welsh Cattle. —For particulars, see page xxxviii.

PIGS.

Arthur Jones, Green Bushes, Port Elizabeth Breeder of Berkshire and Large White Yorkshire Pigs from Imported Pedigree strains; Winners of 14 First, 6 Second Prizes and 1 H. C. at Grahamstown and Port Elizabeth Shows of 1905 and 1906.

OSTRICHES.

Specials only.—Chicks, £5 to £20 each; Young Birds, £10 to £30.—F. W. Baker, Laughing Waters, Willowmore.

GENERAL.

H. Vermaak, The Pines, Maraisburg, Cape Colony, has on hand and for sale at very reasonable prices, PURE-BRED FRIESLAND BULLS and PURE-BRED MERINO RAMS of the RAMBOUILLET breed.

THOROUGHBRED PERSIAN RAMS and OSTRICHES.—Hougham Abrahamson, Long Hope Siding, C.C. Breeder of Rams from progeny of ewes passed into Stud Book. of Cape Breeders' Association. Also selected Breeding Ostriches.

PASPALUM GRASS PLANTS.—Quotations for plants, in bags free on rail Stellenbosch (keep moist long distance). See *Agricultural Journal*, May, 1906, page 622, or from A. C. Bulleb, Dwarsriviershoek, Stellenbosch.

W. Bullen, P.O. Box 1354, Cape Town, Breeder and Importer of Game, Houdans, Leghorns, Orpingtons, Wyandottes, Ducks, Geese, Homing and Fancy Pigeons at lowest prices (all risk taken).

PURE BRED ANGORA GOAT RAMS.

Bred from the Choicest Strains, and Prize-winners at the leading Agricultural Shows of Cape Colony. For particulars apply to A. B. Hobson, Martyrsford, Jansenville.

PERSIAN SHEEP AND OSTRICHES.

S. Montague Gadd, Springfield, Tafelberg. Orders booked for young rams, from Stud-book Ewes and for Ostrich Chicks from the best strains in the country.

THE POULTRY YARD.

PRIZE and UTILITY POULTRY of the BEST ENGLISH and AMERICAN STRAINS.—WHITE WYANDOTTES—PARTRIDGE WYANDOTTES-SILVER-PENCILLED WYANDOTTES—BARRED PLYMOUTH ROCKS—WHITE LEGHORNS — BROWN LEGHORNS—BUFF LEGHORNS—WHITE LA BRESSE. Stock and Settings of Eggs for Sale. Correspondence invited.—S. Smith, Talana, Wellington Avenue, Wynberg.

Geo. E. Barrett, P.O. Box 964, Cape Town. Importer of Poultry, Pigeons, Cage Birds and Appliances of every description from Wicks Bos., Norwich. Trial solicited and Catalogues forwarded on application.

Ulyate Orpington Poultry Farm, Berlin, Cape Colony. Eggs from pure Black, White, Buff Orpingtons, Minorcas, Leghorns. Cock, Hen, and Poultry Remedies *for sale*. For further particulars write *now* for catalogue. Winners of hundreds of prizes.

BUFF ORPINGTONS.

THE FARMER'S FOWL. The fowl that LAYS WHEN EGGS ARE TOP PRICE and are also A 1 table birds. My Buffs have unlimited orchard and grass run, and are noted for hardiness and good laying qualities. Young stock always for sale at very reasonable prices. Ask for inclusive quotations; carriage paid to any station in South Africa and AT MY RISK to rail destination. My list of prizes won at shows all over South Africa will convince you that this unrivalled *Colonial* strain of 9 years' standing CAN HOLD ITS OWN AGAINST IMPORTED STOCK. Buy hardy Colonial-bred birds and save your pocket. Eggs from pure-bred utility strain, 12/6. Address: A. C. Bulleb, Dwarsriviershoek, Stellenbosch.

TURKEYS.

MAMMOTH AMERICAN BRONZE.—HARDY STRAIN OF GREAT SIZE. Noted prize winners. Young stock for sale after April. Orders booked now. Ask for inclusive quotations. Carriage paid to any station in South Africa and AT MY RISK to rail destination. Eggs in season. Full particulars from A. C. Bulleb, Dwarsriviershoek, Stellenbosch.

THE

Agricultural Journal

OF THE CAPE OF GOOD HOPE.

No. 2. FEBRUARY, 1907. VOL. XXX.

Published Monthly in English and Dutch by the Department of Agriculture and distributed gratis to bona fide farmers in the Cape Colony on application through the Resident Magistrate of the District.

Advertising.—Approved Advertisements are inserted. Full particulars can be obtained of Messrs. Hart & Co., the Advertising Agents, Parker's Buildings, Cape Town (P.O. Box 898), to whom all communications *re* advertising should be addressed.

Postal Address:

The Editor "Agricultural Journal," Department of Agriculture, Capetown.

Telegraphic Address: "Bulletin," Capetown.

CONTENTS.

PAGE.

NOTES— 140—145

Wool Prizes at the East London Show.—Farmers' Congress—South African Prune Growers' Association.—Miracles in Agriculture.—The Show Season.—The Plethora of Fixtures and Judging—Cyllin for Internal Administration.—Prizes at the Crystal Palace Exhibition, 1906.

FARM AND VELD— 146—154

Horse-Sickness.—Half-Bred Swiss Goats.—Orchard Competition at Paarl.—Paspalum at Paarl under Irrigation.—Dry Farming.—The Facts of the Case.—The Destruction of Spring-Hares.—Other Methods.—Locust Destruction.—Imported Horses.—Dairying Queries.—Cream-ripening Utensils.—Straining before Churning.—Cream Granulating in Process of Ripening.

A TREATISE ON CITRUS CULTURE FROM SEED TO FRUIT. By W. E. Masters ... 155—172
STUD STOCK FROM GERMANY. (*Illustrated*) ... ... 173—178
MOLTENO DRIFT SANDS AND THEIR RECLAMATION ... ... 179—183
MR. CLAUDE FULLER'S "FRUIT GROWER'S HANDBOOK." By P. R. Malleson ... 184—185
AN AGRICULTURAL CREDIT SYSTEM FOR CAPE COLONY ... ... 186—192
POISONED BAIT FOR THE FRUIT FLY ... ... 192—194
THE CHEESEMAKING INDUSTRY IN GRIQUALAND EAST ... ... 195—198
NATIONAL WOOL, MOHAIR, AND OSTRICH FEATHER ASSOCIATION ... ... 199—204
SOUTH AFRICAN WOOLS ... ... 205—215
ANTHRACNOSE IN CONSTANTIA. (*Illustrated*) ... ... 215—219
SOUTH AFRICAN STUD BOOK ... ... 220—225
THE PRICES OF MEAT ... ... 226—231
OVER-SEA PLANT IMPORT REGULATIONS ... ... 232—236
SOUTH AFRICAN INTER-COLONIAL PLANT IMPORT REGULATIONS ... ... 237—242
WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION ... ... 243—244
CORRESPONDENCE 245—252

Citrus Failures.—Very Like Paspalum.—A Troublesome Weed: *Sokuhria bonariensis.*—Horse Breeding in South Africa.—The Maggot Fly.—Blauwtoug or Malarial Catarrhal Fever in Sheep.—Preserved Green Mealies.—Algerian Oats.—Jackal Proof Fencing.—Weights and Measures for Veterinary Medicines.—Suspected Tubercle in a Cow.

RURAL REPORTS ... ... 253—254
NOTES ON THE WEATHER OF DECEMBER, 1906... ... ... 255—259
RAINFALL RETURNS, DECEMBER, 1906 ... ... 260—262
CURRENT MARKET RATES 263
DEPARTMENTAL NOTICES ... ... 264—280
DEPARTMENTAL PUBLICATIONS ... ... 281—282
AGRICULTURAL SHOW DATES, 1907 283
APPLICATIONS FOR AGRICULTURAL EMPLOYMENT 284
THE PRODUCE MARKET ... ... 285—288
BREEDERS' DIRECTORY ... ... 289—2[illegible]
INDEX TO ADVERTISERS ... ...lxiii—lxiv

NOTES.

Wool Prizes at the East London Show.

The Secretary of the East London Agricultural Society requests us to announce that his society has by resolution decided to eliminate from the Prize List the following clause where bulk wool is concerned: "Exhibitors shall state number of fleeces when making entry."

Farmers' Congress.

The annual Congress of the Farmers' Associations of the Colony opens at Oudtshoorn on March 12th.

South African Prune Growers' Association.

An Association of Prune Growers in the Paarl, Stellenbosch and Wellington districts has now been formed under the above title. Meetings have been held from time to time at which the Government Commercial Agent was present to advise as to grading, packing and marketing. The principle of the Association is to accept from growers the fruit on grade, and to pay them according to the quality and grade. The fruit is to be received at the Prunes warehouse at Koelenhof, where it will be sweated and prepared for packing. The style of packing for the best quality is to be far in advance of the imported article. It will be packed in 28lb. oblong tins with a sliding lid, sealed with tinfoil. The Association also proposes to give with each crate of ten tins, one extra sliding glass lid in the frame, so as to shew off the front without exposing it to atmospheric influences. The label is well got up in five colours and gold, and altogether the appearance should be attractive, and ought to command among the traders a prominent position on the counter and in the windows. The output of the Association for the season is estimated at between 250 and 300 tons. The fact that such gentlemen as Messrs. G. Whiley (Rhodes' Fruit Farms), O. Barry, R. Bulmer, Mostert, R. D. Kock, Cilliers, Kirk and H. O. Arton are taking an active part in the new venture, augurs well for its success. The Commercial Agent is assisting to market this product, and has already received large orders from other Colonies. It is pleasing to note that all the tins and the labels are Colonial made.

Miracles in Agriculture.

Mr. E. R. Bradfield, in a recent communication, calls our attention to the letter published some weeks back by Mr. H. M. Arderne in the *Cape Times*, giving some particulars he had obtained from Mr. Luther Burbank, of the spineless cactus or prickly pear he is now propagating for fruit and fodder purposes. As a natural consequence Mr. Bradfield enlarges upon the great benefits this country might derive from its introduction. But before all these glowing possibilities can be accepted we must ask for a little careful consideration of the whole case. We have here the prickly pear, both thorns and bareleaved or kaalblad which is largely used by farmers for ostriches and in extreme cases for cattle. It withstands drought as no other plant seems to and provides moisture for stock in otherwise dry camps. The proposition now put forward is why not try to introduce this new cactus to take its place, and by having a spineless plant get better value. There is one serious drawback to this scheme, and that is contained in the communication addressed to Mr. Ardeine by Mr. Burbank himself, and though it is of vital importance seems to have been overlooked. Mr. Burbank states distinctly that all his endeavours to raise a spineless variety from seed have failed. It therefore follows that to make any use of his varieties on a field scale it will be necessary to propagate every plant separately from cuttings And not only do that but to take the greatest possible care that the seeds therefrom are never allowed to germinate. In fact it is very doubtful if there is much difference between these and our ancient friend the Kaalblad prickly pear which, when raised from seed, always reverts to the prickly state.

Such a proposition therefore is far from feasible in a country like this, and it is more than problematic whether it would pay. But setting that aspect aside we may ask with some degree of apprehension how the baboons, the birds and other distributors of the seed are to be controlled, for it is well-known that such seeds maintain their germinating powers intact even after passing through the animal system. This, in a sparsely populated country, can only mean that we shall be adding a new pest to the already long list which trouble the farmers, for it would only be a question of time when the new cactus in all its spiny glory would be spread broadcast throughout the land. Where we are all on much safer ground is when we discuss methods of using the abundance of prickly pear we have with us as fodder. This can be done as was shewn in the *Agricultural Journal*, for August 1904, (No. 2, vol. xxv.) There a full description was given of the Texas device known as the Beevis & Hindes Prickly Pear Burner. This consists of an ingenious device for singeing off the spines on the standing plant and thus rendering it available for fodder after being cut down. This burner was introduced into this country by Messrs. Griffiths and Co., of Port Elizabeth, but we have never heard that it "caught on." The possible explanation of this was the fact that it consumed gasoline which, while a cheap commodity in the United States, is rather expensive here.

While on this subject Mr. Bradfield also quotes a work with the title of "The New Earth," which evidently presents in a most readable and attractive form many of the improvements introduced of late years by agricultural scientists in all branches. Such works, like the magazine articles on "Dry Farming," to which we have had occasion to refer, are not always strictly reliable. For instance it seems to be taken for granted that the fascinating theory is a demonstrated fact that every insect pest that troubles the cultivator must have a controlling parasite if it can only be found. And in support of this, details are given of the parasite which was introduced to California by Mr. George Compere some two years ago with the object of reducing the ravages of the Codling Moth. The full particulars of this were published in the *Agricultural Journal* in April last, and it is unnecessary to inform our fruit-growers and others interested that the Government Entomologist has been watching the progress of the experiments made in California with the greatest interest. So far, however, nothing much seems to have been accomplished. Had it proved beneficial Mr. Lounsbury would have lost no time in introducing it to this country, and meanwhile all that can be done is to continue the known remedial measures.

The same remarks apply to the red scale parasite from which something was expected. It has not so far justified the hopes that were built upon it and fumigation and spraying have still to be resorted to. On another subject, however, the author of "The New Earth" seems to be on safer ground. He enlarges upon the great advantages which undoubtedly accrue from the application of the bacterial fertilisers which are now being distributed by the Agricultural Department here, and which have proved of valuable help in other countries. Mr. Bradfield has had some experience of the value of these bacterial fertilisers which introduce the nitrogen-fixing organisms to a soil that is deficient, and he speaks in the highest terms of it. Previous to its introduction he had noticed the difference in some of our soils and how in the deep loamy soils of this Colony the nodules or colonies of bacteria were present on the roots of legumes while in others they were entirely absent.

The Show Season.

The Agricultural Show Season may now be considered to be getting into full swing, it having commenced as usual in the later days of January. With so lengthy a list of fixtures to fill up it is not surprising to hear rumours of a possible falling off in both entries and attendance, particularly as the depression is still with us and a good many of the Western farmers are very busy just now. Paarl and Stellenbosch opened the season, the former scoring a big success and the latter coming very close up to last year's level.

These two fixtures should never be in doubt for they have many natural attractions which must always command attention, the first being the fact that are the great fruit shows of the Western Province, and the second being that each is situated within easy reach of Capetown, and are held in such pleasant surroundings that they offer a pleasurable outing to many seeking a relief for the moment from the city. Worcester was held in the early days of the month and the reports to hand do not speak so favourably.

This month is full of Shows both East and West as will be seen on reference to the list published on another page in this issue. The principal feature will be the big fixture of the Western Province at Rosebank, for which the preparations are now proceeding apace, and which promises to eclipse all former endeavours. This opens on the 19th. The other Western Shows to be held this month include Bredasdorp, Malmesbury, Robertson, Ceres, Riversdale and Caledon. As several of these appeal to the same class of exhibitors it is to be feared that they cannot all be unqualified successes. In the Eastern sections we have the same plethora of riches. Aliwal North and Queenstown actually overlap with their dates, while a smaller show at Bayville comes in about the same time with the more important King Williams Town fixture at the end of the month. March is just as full as February, and the season extends well into April. With all these Shows fixed and more likely to come on next year it looks as though the time has arrived when there should be some reorganisation of the system in the interests of everyone concerned, for it is doubtful if we have a sufficiency of exhibitors to do real justice to them all, even though a sympathetic public may exist in numbers great enough to provide a payable "gate" everywhere. What the upshot may be it is difficult to say, but that some change must be imminent seems fairly certain.

The Plethora of Fixtures and Judging.

Another point which seems likely to cause some embarrassment is the provision of efficient judges when there are so many Shows to be supplied. This question has been discussed a good deal in detail at various times but remains in much the same state as ever. The real question at stake is the actual value of an agricultural show to the country. There can be no two opinions when it comes to a question of competent or incompetent judging. In the one case the decisions are an education to all interested, in the other they bring the show down to the level of a local fair providing a day's amusement and outing, and the awards become a secondary consideration. Now, as all these shows are supported by the State, they cannot be allowed to descend to that level; and it therefore behoves all interested to face this question as early as possible and find a satisfactory solution.

Two obvious suggestions have been made from time to time which their advocates think should settle these questions. The one is as regards the holding of so many small shows, the other as to the vexed question of providing competent judges. As the one is partly wrapped up in the other we may state them together. It is briefly this, that in order to strengthen local shows and make them of as high an educational value as possible, a system of rings, circles or zones—call them what one may—should be formed, and the shows in these areas be held in certain centres therein at regular intervals. Then by instituting a system of single judges a larger proportion of competent men would be available for the whole Colony. There is, of course, a great deal to be said on both sides of this suggestion, and it would be as well perhaps if it were thoroughly thought out soon, for it may be up for discussion earlier than is anticipated. There is no need to enter into the arguments here, that is for those interested; but it seems certain that with the public finances in the condition they are at present some demand for modification of the calls on the Treasury for these purposes is bound to come.

Cyllin for Internal Administration.

Some interesting experiments were carried out some little while back by the Veterinary Branch of the Agricultural Department in testing the effects of Cyllin on animals when administered internally. As is generally known Messrs. Jeyes, who prepare this article, claim for it that it can be given internally without causing any ill effects, while its action being germicidal is of great benefit in several ways. The first experiments were tried with goats when doses varying from a quarter to half an ounce in from six to sixteen ounces of water were given, but each proved more or less distressing and harmful. But when a quarter of an ounce of pure Cyllin was administered in a capsule it caused no ill effects whatever. In handling oxen in the same way it was found that an ox could be drenched with half an ounce of Cyllin in a quart of water without difficulty and without bad effect. One ounce in the same quantity of water was administered with difficulty, the animal choking frequently in a spasmodic manner. On increasing the dose to an ounce and a half in the same quantity of water it was found to be impossible to drench the ox, as spasm of the glottis seemed to set up at once. When, however, the Cyllin was given in capsules, as much as two ounces caused no bad effects whatever. In the course of further experiments it was found that the addition of a small quantity of oil and bi-carbonate of soda to the mixture of Cyllin and water renders its administration comparatively easy in case of oxen. Thus one ounce Cyllin, six ounces oil, ¾ ounce soda bi-carbonate, and one quart of water, was given to two oxen with comparative ease. Also ½ ounce Cyllin, 4 ounces oil, ½ ounce soda bi-carbonate, one pint of water, was given to the same ox on two successive days with ease. In regard to dogs the capsules were used. These dogs received on the Monday, four, eight and 12 minims each; on the Tuesday the same, and on the Wednesday 8, 16 and 24 minims each, and no effects whatever are reported to have followed the administration of these doses. From these experiments it is believed that this preparation should be found to be useful in dealing with some of the intestinal parasites which infest farm stock, more particularly wire worm in ostriches This has yet to be tested but if its action on these is the same in proportion as carbolic acid—and as a germicide it is proven to be much higher—then some valuable and interesting results should follow.

We may mention that Jeyes are now putting out the preparation made up in capsules for human consumption in a shape they call the Cyllin Palatinoid, and these are claimed to have exercised beneficial effect in various forms of intestinal trouble. If they can be administered without ill-effect to the human system they should certainly be of some use for animal purposes. All the other preparations of this firm, now so well-known, including the famous disinfecting fluid, powder, soaps and toilet preparations have become almost indispensable both in town and country so that there is not much need to mention them here, except to point out how valuable and useful they are.

Prizes at the Crystal Palace Exhibition, 1906.

We regret to state that in the list of awards at the International Exhibition of Food, Health and Hygiene held at the Crystal Palace, London, in August last, published in the *Agricultural Journal* of November, the prizes awarded to the Van Ryn Wine & Spirit Co., Ltd. were omitted. That firm was awarded Gold Medals for Hermitage, Drakenstein, F. C. Sherry, and Van der Hum; Silver Medals for F. C. Pontac and Sweet Constantias (red and white); and a special prize for Sparkling Wines.

Messrs. R. Wilson, Son & Co., of Hout Street, Cape Town, forward a copy of that exceedingly useful publication, "Thorley's Farmer's Almanack," for 1907. Although compiled for British conditions it contains much that is useful and valuable to farmers and farmer's wives in any part of the Empire. Messrs. Wilson, Son & Co. will be pleased to send a copy to anyone writing for it.

FARM AND VELD.

Horse-sickness.

"As there is a possibility of the dreaded Horse-sickness breaking out again in the course of this year," writes a Riversdale correspondent, "would it not be a good thing to refer to this matter in the forthcoming issue of the *Agricultural Journal* ? By so doing you would certainly be rendering a great service to the country generally, as a remedy for this disease may have been recently discovered."

We regret to state that no actual remedy has as yet been discovered for this disease, though the experts in those Colonies like the Transvaal where it is of frequent occurrence have been closely investigating it for some time past. The knowledge which we have obtained from those who are conducting these investigations into the nature, origin and prevention of Horse-sickness clearly points to the following conclusions :—(*a*) That the infection is communicated to healthy susceptible horses by some nocturnal insect, and the evidence points to a species of mosquito. (*b*) Horses exposed in a deadly infected area are effectively prevented from infection by being completely covered by a fine net capable of keeping out all winged insects. Burning horse manure, or a similar substance which gives off a dense smoke, in an ordinary stable has also been shewn to be an effective preventive measure. Hence constructing a kraal on an elevated situation a considerable distance from any vley, ditch or stagnant water is a well-recognised method of preventing infection. As an extra precaution increased safety would be secured by burning some horse manure or similar damp fuel on the windward side of the kraal.

Further, as Horse-sickness is distinctly related to malaria in its nature and origin, small and continuous doses of arsenic—three grains daily—have been given to horses which had to be exposed during the night, and the general opinion of those who have used it most is that it acts beneficially as a preventive of the disease. Of course a stable with wire gauze on doors, windows and ventilators would be a perfect means of prevention, provided that every care was taken to clear out all mosquitoes, etc., before closing up in the early evening.

Dr. Theiler, of the Transvaal, has discovered a method of preventive inoculation which has been successfully applied to mules on a large scale, and with a very small percentage of loss. His inoculation experiments with horses, however, do not as yet justify him in recommending its adoption to them, although he hopes to arrive at a satisfactory solution of the difficulty.—D.H.

Half-Bred Swiss Goats.

In accordance with a promise, Mr. F. Wolff, of Vosburg, forwards some particulars of the milking records of his half-bred Swiss Goats. He states they give—on an average presumably—four and a quarter, three and three quarters and three and a quarter bottles of milk daily. They were tested while running on ordinary veld, but if stall-fed he is convinced they would give much more. The kids are now three months old and the flow of milk has fallen off very little since they were born. The kids, he adds, are quarter bred, so that there is a possibility that they may do better than their dams when their turn comes.

Orchard Competition at Paarl.

At a recent meeting of the Paarl Farmers' Association the report of the judges—Messrs. I. Tribolet and P. B. Myburgh, sen. —in the competition for the best kept orchard in the district ("Jagger" 50 guinea silver cup) was read. The points awarded placed the three highest out of a possible maximum of 125, as follows:—M. S. Louw, "Boschendal," Groot Drakenstein, 108; E. H. Read, "Groenfontein," Wellington: and F. J. Mayo, "Watergat," Simondium, 107 each. Mr: Louw is, therefore, the holder of the cup for the next 12 months. The judges in their report remark: "Every point was carefully gone into and the totals came out so remarkably close that judging was very difficult. On the whole the cultivation and general condition of the orchards entered are excellent. Up-to-date implements and methods are used and insect pests and fungoid diseases have been kept under fairly well. The most serious of these are the codling moth, pear slug and American blight. The latter on some of the older apple trees which are not on blight-proof stocks has been found rather difficult to deal with. Some shot-hole fungus on plums and apricots, fire blight on apples, and the effects of curled leaf on peach trees, were noticed here and there. With the exception of pears, "tragedy" plums and "morpah" apricots, the crops are good. Thinning has, where necessary, been practised, especially in plums at Drakenstein, and apricots at Wellington. Plums and prunes on peach stocks do much better in every instance noticed than on plum roots.

The report was adopted and a vote of thanks passed to the judges, and the action of the secretary endorsed in connection with the arrangements made. Mr. Louw, who is very popular in the district, received the hearty congratulations of those present.

Paspalum at Paarl under Irrigation.

Mr. J. Gribble, hon. secretary of the Paarl Farmers' Association, kindly forwarded the photograph from which the accompanying illustration was made. The bundle of *Paspalum dilatatum* shewn here was grown in ten weeks under irrigation by Mr. H. P. van Eijk, of Paarl district. The sheaf stands 6½ feet high. There is no need to enlarge further—the illustration speaks for itself.

Dry Farming.

In December last Dr. Steyn of Mooreesburg drew attention to an article which recently appeared in the *Century Magazine* describing a system of farming which is alleged to have revolutionised the dry regions in the United States of America. In publishing this we drew attention to the fact that this so-called system of " Dry Farming " was by no means new to agriculturists in this or other countries, as it was based on the principle consistently advocated, and much practised, in this Colony of deep cultivation in order to conserve the soil moisture. A popular magazine may be allowed to put such things in so attractive a light that many are misled, but when the subject has to be considered by those responsible for the opinions they express, these matters have to be approached with greater care and more restraint. The Agricultural Department, to make assurance doubly sure, approached the United States Department of Agriculture on the subject and by a recent mail received the following reply from Mr. James Wilson, the Secretary to that Department, who is not only so situated as to be able to give an informative opinion, but is also one of the world's authorities on all matters agricultural.

The Facts of the Case.

Mr. Wilson in the course of his letter says though he failed to see the special article to which his attention was called in the May Number of the *Century Magazine* he had seen several others one of which appeared in the August number of the Century, and another in the July number of the *World's Work.* I regret to say, he continues, that both these articles convey a very erroneous opinion of the possibilities of dry land agriculture in the semi-arid districts. Some of the statements are undoubtedly exaggerated and over-drawn. Some of the important factors which have led to the favourable results of agricultural operations in these districts have been entirely omitted. Among these latter is the fact that these semi-arid districts have been enjoying a remarkable increase in precipitation (rainfall) above the normal for the last three or four years. In some instances this increased precipitation has amounted to as much as fifty per cent. above normal. This increase in precipitation is undoubtedly temporary, and there is every reason to believe that the normal precipitation will be restored within the next few years. This series of wet years has, however, brought about an accumulation of moisture in the soil which has enabled farmers in this area to obtain phenomenal results. It is a common experience that where soils fail to produce a crop for several years on account of a lack of sufficient moisture, there is an accumulation of valuable plant food in the soil which is at once made available when sufficient moisture is applied. The phenomenal results spoken of in the article mentioned are undoubtedly experiences of this kind, and do not fairly represent the yields that can reasonably be expected under normal conditions. In my opinion, therefore, the conclusions that have been drawn from the facts stated are not warranted.

I am a great believer in the possibility of greatly increasing the agricultural resources of the semi-arid districts by proper methods of farming. I have caused to be inaugurated an expensive system of experimentation along these lines, in co-operation with the State Experiment Stations of the States lying within the semi-arid districts east of the Rocky Mountains, known as the Great Plains Area. Eight sub-stations have already been established, and others will undoubtedly be established in the near future, where all the various methods of agriculture calculated to conserve soil moisture will be systematically tested. It is believed that the results of this work will be of immense importance in developing the resources of this district. No publications have yet been issued covering this work, but as soon as the results warrant it the public will be given the benefit of this work.

The above communication places quite a different aspect on the whole subject of "Dry Farming." But it must not be supposed from this that Mr. Wilson or anyone else who has the best interests of agriculture at heart would desire for one moment to deter farmers from attempting to do all that lies in their power to increase production in those areas where the rainfall is deficient. To this end the officers of this Department have consistently urged on farmers in this Colony to pay increased attention to the question of moisture conservation. It has been pointed out with almost tiresome reiteration that great advantages accrue from deep tillage and continuous surface cultivation.

The Destruction of Spring-hares.

A correspondent, writing from the Vryburg district to the Agricultural Assistant, says he that has made several attempts in the direction of destroying spring-hares. He has tried dynamite, also the new Vermin Choker, put on the market by Messrs. McDougall, but neither had much effect on the spring-hares, and he doubts very much if anything of the kind will have much effect on these animals in the holes. There is one peculiarity of the spring-hare, he continues, which is perhaps not generally known. That is when the animal comes out of his hole in the night he scratches his way out, leaving a lot of loose earth in the bottom of the hole behind him. When he comes to the surface he leaps out clear of the hole; this is owing to his long hind legs and short front ones, all his actions being by leaps of the hind legs. When he returns to his hole he scratches his way back again, closing the hole behind him so that no smoke or anything else that I know of can reach him. The only indication that he is in the hole is seeing this partly-closed entrance. I placed a "choker" well up in a hole where I could see the animal was at home. It burned well. I closed up the entrance, watched operations awhile, and returned the next morning to see the effect of the smoke, which I should say was strong enough to kill almost any animal. I found that the spring-hare had dug his way out at the other end and was gone. They are very destructive animals on mealies and growing crops, and it would be a good thing if any means could be discovered of getting rid of them.

Other Methods.

Early last year a correspondent dealt with this subject in the *Agricultural Journal*, when he suggested the following as a good method of getting rid of these destructive little animals. Take stones which closely fill up the holes or burrows; place the stones exactly two feet deep in the holes. Fill all holes in this way. Take the dogs out the same evening. Let one or more persons watch the holes with kerries. Don't move, as in that case the hares will take fright and scamper away quickly. The next evening all burrows should again be stopped up. By nine p.m. all hares will be out in the veld.

Another correspondent writing earlier gave the following plan:—If convenient lead a stream of water into an open, fresh and isolated burrow. Watch and wait at its mouth for the exit of the culprits; arrest without bodily harm or injury, two, or three or more. Keep in custody until thoroughly dried and preserved from the effects of their drenching. Have each culprit led back by a custodian to the village infested by them; tie a good charge of dynamite to their tails, and at a given signal ignite and release into open burrows a few yards apart. Retire immediately, and rest assured that those (if any) surviving will not trouble you again in a hurry, but will prefer finding pastures new. If no stream of running water is convenient a 32 gallon cask of water will suffice, or three or four boys with buckets from a pool of water within a few yards of the spot.

Locust Destruction.

Mr. P. P. Kruger, of Geduldfontein, Steynsburg, reports the successful tackling of several swarms of locusts with the arsenite of soda solution. In a letter to the Resident Magistrate he says:—"I have used one pound of the soda (scrub exterminator) per ten gallons of water and have killed fifteen swarms. Every swarm I attacked was totally annihilated. In some cases when I had not sufficient of the arsenite of soda I sprayed one half of the swarm and the other half also died. Further I have sprayed several swarms which all died within six hours. I am quite satisfied with this method and very glad that a means has been discovered of destroying these destructive creatures."

In order to avoid misunderstanding as to the terms upon which the Government grants aid towards the destruction of locusts it should be remembered that the assistance given is two-thirds the cost of Sunlight or other cheap soap, free supply of arsenite of soda, and the loan, free of charge, of spraying pumps.

Imported Horses.

The Bucknall liner *Johannesburg*, on her last trip, brought a number of very valuable horses on account of the De Beers Consolidated Mines. There were ten very valuable animals, the particulars of which are as under:—Bass Rock, grey horse, which has been a frequent winner for Mr. Leopold de Rothschild. A bay colt, by Chevening, out of Rosa Melton, two years. Kid Glove, bay mare, by Childwick, out of Hunt Ball. Acquisition, chestnut mare, by Worcester, out of Knowledge. A brown mare, by Orme, out of Miyanoshita. Sorceress, brown mare, by Trenton, out of Nemesis. Floreta, bay mare, by Florizel II, out of Italica. Argovian, chestnut mare, by Ayrshire, out of Lais. Varenna, brown mare, by Lavenno, out of Gallinacean. Queen's Pleasure, brown filly, by Diamond Jubilee, out of Capucine. When the horses were landed they were in excellent condition, and complimentary remarks have been made by the De Beers Company on the condition of the horses on arrival.

Dairying Queries.

"Persevere" writes:—*Cream Ripening Utensils.*—It seems to be the recognized thing in Cape Colony to use enamel buckets or dishes. Undoubtedly there is the advantage of simplicity in cleaning such vessels, but against this there is the inevitable chipping of enamel which makes the utensil practically useless, or, at least, renders its use undesirable. In Sweden "dairy steel" buckets are used as also wooden vessels, but the first-named largely predominate. Does this fact point to any special virtue or advantage in the use of such ("dairy steel") utensils? Can chemical action, to the detriment of the cream and the resultant butter, be set up when cream is ripening in a "dairy steel" vessel? I am experimenting now, but would like to have the benefit of expert advice? *Straining Cream before Churning.*—Is this process one of those things whilst theoretically correct, is not so absolute in practice under certain conditions? The idea of straining, as we know, is to prevent lumps of cream going into the churn in that condition, to the consequent detriment of the butter. Suppose, however, that the cream contains no lumps, what then? In passing cream through a strainer or butter cloth lumps are broken and passed through same (the strainer) in a more fluid state. Now the question arises: Is it advisable to break up such lumps and let them pass into the churn as described above? I am inclined to doubt the advisability of allowing them into the churn in any form as, for one thing, such lumps may not be properly ripened, in addition to containing possibly more than a proper share of casein. I make this statement with reserve, however. When a strainer is used for straining what is the size of mesh usually employed, or, in other words, how many holes to the square inch? *Cream Granulating in process of Ripening.*—I have sometimes observed that during sultry weather cream newly separated, thickens in process of cooling (though it doesn't sour then), but when stirred appears to become more fluid again. At the same time, however, small lumps, or granules, are formed in greater or less quantity. Is this simply the sultriness of the weather or can other reasons be assigned, and if so, what are they?

Cream-ripening Utensils.

Mr. R. Silva Jones, the Dairy Expert, answers these queries as follows:—Block tinned steel certainly makes the best cream-ripening utensils, and the shape of the vessel is best in any form that allows a large surface to become exposed to the air. They should not be too deep. Enamelwork makes excellent vessels for cream ripening as long as it is not chipped, but the moment it becomes chipped and the cream comes in contact with exposed iron below, then trouble soon comes. It gives the butter quite a fishy flavour. Tinned steel has every advantage as regards cleaning that enamel ware has, but the cost is greater, and for that reason I am inclined to think it is not more generally used. I am not aware of any chemical action on the cream or butter that will take place by the use of tinned steel vessels.

Straining before Churning.

The process of straining before churning is essentially to reduce any lumps of cream to the same consistency as the bulk, to ensure an even cream; and thereby aid the churn in its process of churning and ensure all the cream being actually churned into butter. If the cream has been properly ripened and well cared for on the lines as laid down in articles on the subject in the *Agricultural Journal*, then straining is not absolutely necessary. If your cream be at all lumpy, strain without hesitation, and after all the cream has passed through, squeeze the lumps through the straining cloth with a squeegee. The prevention of the formation of these lumps should be attended to in the ripening process, and can be done by an occasional stir of the cream, say two or three times a day, and if one is considerably bothered with these lumps, then there is little doubt that your cream is not running sufficiently thick from the separator. Remember when you separate that you require cream alone and not cream and milk mixed. The presence of the milk will cause no end of trouble. Do not use metal strainers for cream; fairly strong butter or cheese cloth is far better.

Cream Granulating in Process of Ripening

I am not quite clear as to what is meant under this heading. Cream naturally thickens in the process of cooling, and naturally owing to its specific gravity, the best or largest fat globules will rise to the top, leaving the more fluid portion of the cream at the bottom. And when the top is broken down and mixed with the more fluid portion of the cream at the bottom, the appearance of the cream certainly will become thinner. The two latter questions lead one to think that the cream in the process of ripening is not stirred continually, which would obviate these troubles.

A TREATISE ON

CITRUS CULTURE FROM SEED TO FRUIT,

Shewing the Influence of the Stock.

BY W. E. MASTERS
(Formerly of Grahamstown, C.C.)

CHAPTER I.

PERSONAL AND INTRODUCTORY.

Having promised one or two Government officials in the Department of Agriculture in the Cape of Good Hope to write down my discoveries in fruit-growing and citrus-working—they having shewn it to be a simple matter of duty—I redeemed that promise, and briefly recorded them.

Since then, having perfected my system to include both root and branch, growth and fruit, on the simple lines of Nature, I feel bound to make the whole thing widely known and readily understandable.

It will be for the reader to assess its true value, as also the value of the criticisms that will arise when it shall be shewn that the whole of the failures in fruit-growing originate from the neglect of a few simple fundamental points heretofore never systematically co-ordinated.

Honest, deliberate criticism I welcome, and if in attempting to prove me wrong the Masters' system is found widening out and embracing horticulture in all its branches, I shall feel, in publishing it, I have done my duty to those whose difficulties no one can appreciate but he who has suffered them.

To make mere superficial criticism more difficult I have purposely omitted the connecting link in several chapters, in order to compel those who prefer "criticism" to "knowledge" to read the book through.

If thereafter they develop their own particular work and carry it to a stage reached by no former grower, they will experience the pleasure and profit of my system, and *conviction* will replace criticism.

The study of Nature's laws in connection with the propagation of citrus trees proves that all "Nature is akin," and one law is as equally applicable to plant life as it is to the governance of the animal kingdom with man as chief.

"Grafting" is supposed to have originated from an accident down the ages of time. "Training" also originated from accident, a puff of wind—a triviality! Yet coupled with concatenating circumstances, it furnished a clue, which six years more shewed but led to another of still greater importance, and in the same way that it would have been impossible for the "ancient discoverer of grafting" to have limited the scope of his accident, so now the discoverer of "training" from human frailty is unable to predict the uses to which his alphabet may not be put from the accidental discovery of a few of its letters.

"Grafting," while it gave union, failed to unify. It revealed one secret only to disclose the depth of the others, but "Training" and "Stock-influence" are a definite road lit by knowledge, the traversing of which, while it means commercial success, will incite lovers of the beautiful to penetrate still farther and reveal more of the marvellous mysteries hidden in Nature.

Citrus Possibilities.

South Africa is essentially a citrus country, provided citrus be understood.

Some 95 per cent. of the worked citrus trees planted out in South Africa have emanated from the nurserymen, the balance, that is, the *un*-worked trees, are seedlings grown by the farmer. The nurseryman, in an honest and legitimate endeavour to meet the demands of his customers, sells trees by name and by size at a reasonable price.

The fruit farmer or planter, on the other hand, after weary years of waiting to see the great results eventuate that had been predicted, finds the seedlings he himself planted, flourishing, whilst the "pedigree" grafted oranges are dying off, or refusing to grow.

When his request to the nurseryman to state "the reason why" is met by unsatisfactory replies, the planter loses confidence in them, and naturally enough also in the supposed "expert" knowledge of the man who grew his trees. The inevitable reaction follows, and *nothing but seedlings* becomes the order of the day, leaving the Colony worse off than it was thirty years ago, when droughts were less prevalent. To-day there is little faith in possibilities, except among those whose ardour has never been damped by practical experience. There is less faith in the assumed "expert" knowledge of either the nurseryman or the man who "once had a splendid grove"; there seems nothing but doubt—paralysing doubt—confronting the working farmer, and experiment with the off-chance of success over his richer and more venturesome compeer.

There are many for whom fruit-growing has still a powerful attraction, and who implicitly believe this Colony will yet export millions annually, if facilities are forthcoming to warrant the attempt.

The geographical position of South Africa leaves but little to be desired as a prospective exporter of fruit to the northern markets of the world, and although in years to come South America may prove a formidable competitor, yet, as Mr. Lounsbury, with whose opinion, formed on the spot, I concur, seems to think, "the first in" will probably hold its own right through.

If then I am able to shew that high-grade oranges can be successfully grown in this country, it seems reasonable to assume hundreds will make *another* attempt, and hundreds more full of courage *and capital,* will be able to commence on proper lines and win success.

Seedling oranges, as will be later explained, cannot command an export market without organisation, system and selection in planting, whereas the highest grades of named varieties grown on the "Masters' system" must obtain a market, and may command a price that for many years would make them prohibitive to all but the wealthy.

The object of this book is to shew in what the foundation consists, and how an export trade may be built up.

There is only one system of orange growing—I might almost say *fruit growing*—which has ever succeeded, and the omission to co-relate that system *with success* accounts for every failure in the initial stages of fruit production throughout the world.

CHAPTER II.

SEED.

Influences Affecting Seed.

Whilst the "Masters' training system" deals but little with seed as "seed," yet the selection of true and suitable seed constitutes the foundation for all that follows. Seeing also that a study of the behaviour of citrus seeds furnished the first clue to "Stock-influence," it may be interesting and instructive to relate the doubts from which grew certainty.

The aspect of how to grow the tree suggests also the vast and endless ramifications surrounding the formation of the seed itself. Nature produces the tree, the blossom, and the seed, but *man introduced grafting.* It is a generally accepted belief that grafting has no effect on the seed, and that a seed is nothing more or less than a seed, some perhaps more true than others, but nothing especial is attached to its selection with regard to influences affecting it.

Botany does not admit that the seed may be affected by the stock, but recognises the influence of bees, therefore if the Science of Botany is built on absolute knowledge, there can, of course, be no such thing as stock-influence as affecting seed!

Some nine years ago I was told by an old grower in the district of Bathurst that the seed of a naartje* grafted on to a lemon stock would produce *lemons* if planted!

Further enquiries found another advocate of this theory, who had planted the seeds of a very fine naartje in a box; and although the dry weather killed the lot, two *lemons* came up, for which he could not account. Another told me that some years ago he had planted naartje seeds, and had got a sour naartje, quite as sour as a lemon, although it looked exactly like a naartje in appearance. He had dug it up and thrown it away, as it was unsaleable and a danger to his marketing reputation. Another farmer said he had got *both*, lemons and naartjes, from the same fruit!

These men were farmers of known veracity and of methodical habits, whose citrus trees ran well into hundreds, but who invariably grafted naartjes on to the lemon stock to give larger fruit and greater growth.

I submitted the problem to the three leading horticultural lights in South Africa, as also to a professor of Botany; and it is a matter of some doubt to me at this time to say who exhibited the most amusement, they or I? One often referred to it afterwards as a huge joke! On a subsequent occasion, in conversation with one of Bathurst's most observant farmers, he related that his experience was identical with the others, and that a naartje seed from a lemon stock should never be planted for a seedling, no matter how fine the fruit appeared. He had never noticed it with *oranges,* possibly because he never grafted oranges, but always planted the seed of a seedling tree, he certainly thought the *stock* affected the seed, as much as it affected the flavour, and any orange-grower could detect the flavour of the lemon stock in an instant, but it was more pronounced in some trees than in others. Some considerable time after this, I asked a well-known grower in replied that he never grafted, but a lady had given him one seedling tree which she said was a naartje, but it turned out to be an orange of good quality. She, however, was positive that she had planted the seed from a naartje, as the quality was so excellent.

These constant, persistent statements rather annoyed me, so to prove they were absurd and erroneous, I bought from a fruiterer 180 mixed naartjes, and planted the seed in newly deforested land. True enough, when the seed shewed up, there were naartjes, and also *lemons,* and some that for three years afterwards I could not distinguish whether they were naartjes or lemons, having the leaf characteristics of both. The lemons and the naartjes both grew well, but the mongrels were always weakly, and would not respond to coaxing. One flowered at six months from seed. Having a friend in Natal who was a large grower with ample experience, I requested his opinion, and he informed me very tersely that I had got "mixed-up," the results I mentioned being quite impossible. He went on to inform me that of all the citrus family, he was quite correct in saying they (the mandarins) came the truest to seed, in fact, in 99 cases out of the 100, they were absolutely true, *and he knew!*

---

* Naartje.—The South African common name for Tangerines and Mandarins

Here, then, was food for thought, as well as for patient investigation. Somebody was wrong, but who? The men who ought to know ridiculed the idea, or ascribed it to bees; and the men who were supposed to know least seemed to know most. How could the facts be pieced together?

In Natal, where they invariably propagated naartjes from seed, with lemon trees and bees as plentiful in one place as the other, the seed came true; whereas in Bathurst, where lemons are the usual stock on which to graft naartjes, the seeds seemed to partake of the nature of the stock. Could it be bees in one place and not in the other, if so what was the common ground? One supposition seemed as reasonable as the other, and remembering the very satirical remarks of the "leading lights" and the absence of "stock-influence," as declared to me by the Botanist, I felt the choice lay about equal between "Bees" and "Stock-influence." However, to make a long story short, I may mention that it *was* stock-influence pure and simple, and although in pursuing my investigations much corroborative evidence seemed elicited, nevertheless, it was the knowledge imparted by an accident that made everything plain.

Armed with this knowledge, investigation was easy, and although there were no absolute records kept in many of the groves I visited, yet many owners knew from long past experience the habits of particular trees, and often truly analysed the reasons for such peculiarities. Everyone who planted oranges from seed agreed that it was not every orange tree that would reproduce its counterpart. When a grower had a tree of this description, he mostly propagated by layers. Trees that were correctly reported as being able to reproduce identical trees again were invariably seedlings from seedlings, and the trees that produced the *truest* to their own type again were always those whose ancestors had been seedlings for the past four or five generations at least, and it may be added possibly half-a-dozen more.

By this time having, as I then thought, a proper system, and let me confess, too, swayed by the general opinion then prevailing, that the lemon was the best all-round stock for grafting on, I unwittingly fell into the error of using other people's brains in preference to my own in matters which they think they cannot properly understand from want of experience. That there was a stock-influence seemed very reasonable the more I thought over the matter, but it was too utterly ridiculous that a learner, as I then was, had proven something that was opposed to the science of Botany, and universally accepted as incontrovertible However, after puzzling over it for many months, I budded and grafted one-half of my lemon stocks, and decided to risk it.

A simple, common-place accident soon afterwards gave me the idea I had been groping for, and originated the first part of the "Masters' system." Unfortunately for me I used the lemon (that is, the ordinary Wild, or Rough Lemon) as my stock, but for those who are now about to profit from my nearly eight years' incessant work and fortunate "accident," it supplied the key to future success; for had the lemon stock not been decided upon, the influence of the stock could not possibly have been discovered, and the second part of my system, by far the most important, might have remained in obscurity for many years longer.

Stock-influences, which are two-fold, will be discussed in their proper order, and under their respective headings, but sufficient has been said to shew that seed, being the foundation of either the tree, or the stock, must have truth innate, if it is to give the sure foundation on which to build.

Experiment, as well as success, rests principally upon a definite determinate fixed type or standard stock, before it is possible to say what influences predominate in the seed. Thus fixed types of seedling orange, pamplemous, or rough lemon, which have never been devitalised by grafting or crossing, and which originate from healthy and vigorous parentage, will produce their own true type again, giving their standard growth results in similar soil and climate.

Truth, that is to say, a certain definite fixed type must be found in the tree before it can be expected again in the seed, and an experiment can only be pronounced final and conclusive when the whole factors governing the results are known and duly estimated.

To determine the relative stock-influences at work in forming the character of seeds, a seedling naartje was grafted on to a Seville stock. At four years old I took a scion from this naartje-Seville, and grafted it on to a vigorous three-year-old seedling lemon stock. As soon as this naartje-Seville-lemon naartje came into full bearing, the entire crop of fruit, producing some 3,000 seeds, was planted in a specially built brick tank to determine the influence of two intermediate first-unions as affecting seed. Surrounding those seeds were planted healthy Seville seeds, to act as "controls," in order to shew by their behaviour how much the seed growth of the naartje-Seville-lemon seeds had lost vigour by the changes made by grafting on to dissimilar stocks, and how far bees affected their pedigree.

The tree from which the fruit was taken grew in a portion of my garden surrounded by rough lemons, oranges a little further away, but neither Sevilles nor naartjes in blossom within a long distance.

The results may be summarised as follows:—

(1) Bees play a very unimportant part in cross-pollinating trees, there being not one lemon.

(2) That the influence of the Seville and the lemon, being simple "first-unions,"* had neutralised each other, and

(3) That the influence of the naartje, itself a seedling, easily predominated, notwithstanding its vigour was lost.

(4) That of the 3,000 seeds planted, more than two-thirds were devitalised by "mongrelising," having insufficient vitality to push through the soft, prepared earth. Some 500 or more "broke their necks" in attempting it, the remainder were weaklings of the weakest type, and at one year old, were barely three inches high.

The "controls" stood like sturdy giants surrounding a few hereditary cripples, growing fully eight inches to two inches of the weaklings.

Of the survivors, there seemed to be slight traces of Seville or lemon in their leaves, but too indistinct to pronounce upon.

The experiment proved conclusively that simple first-union grafting cannot affect seeds in any way except only as regards a weakening of their vigour.

Seed Selection and Raising.

One of the greatest mistakes made by amateurs and others in seed-raising is to pamper, or "molly-coddle" seeds. Whether seed is planted for stocks, or for fruit-trees, the law of the survival of the fittest should be rightly followed.

The destruction of every weakling by a natural process should be the first step. A weakling tree will remain a weakling until it dies, and will be found to have given a thousand times more trouble in its short life than if it had never been planted out in the nursery. It may be pushed on, or kept till older, and sold by size, and no doubt often is, but if planted out, it will more readily succumb to a dislike of its scion, or die by early bearing, or other stress, where a healthy tree would continue to flourish. When a planter decides to select his own seed for his own planting, the first essential is healthy parentage. Never plant a seed from a tree dying of Root-rot, or if possible from the seedling of a Root-rot killed parent, to plant out in a Root-rot infected orchard. Such seeds seem calculated to predispose the seedlings obtained to contract the disease.

Seedling citrus trees of any description grown from the seed of a parent tree suffering from Red-scale, are readily susceptible to it, and form good footing for the first scale-insect tackling them; whereas many citrus trees whose parents have been Red-scale-free, afford no feeding for the insect for two and sometimes three infestations, the scale dying of itself. Some citrus trees are more immune to Australian Bug than others, and if the Lady-birds do not thrive where the planter resides, attention should be given to a bug-free parent. Whatever the prevalent disease happens to be in the planter's district, the seed should be chosen as much for the parent's immunity to that disease as for excellence of stock or fruit. In seed-raising, never use a fertiliser unless one intends using the same fertiliser in the orchard hereafter. The planter's object should be to get the best fruit, the healthiest and most vigorous trees *under natural conditions*, and to train the seed at once for its future soil, by planting it in the same, or as nearly as possible the same, soil as that contained in its permanent site.

---

* See First-Union Grafting.

A few bags of top-soil from the actual future site is ideal ground for seed-raising. Never raise in a loam to plant out in a sand; these require different root formation, and a tree does not readily change its root-system. For a sandy orchard, plant in a sand, and for a loam, in a loam.

The seed-bed should carry a skeleton frame for shading, if the seed be planted in the spring.

The best method of seed-planting is as follows:—

In the previously-prepared seed-bed make straight furrows with the finger, or a bit of stick, one inch deep, and about half-an-inch wide at the bottom, the furrows to be four to four inches and a half apart. These furrows should be sown with selected seed freed from pulp, but still moist.

Two, or even three, seeds deep—that is, lying one on the top of the other—is not too thick. Cover with sifted leaf-mould—three-eighths mesh—to a depth of three-quarters of an inch above the centre of the seeds. Keep constantly moist, but not wet, and remember that the summer sun will burn every seed as fast as they come through unless shaded. When the seeds germinate they will lift up, and "carry on their heads" the ground all along the furrow. Slowly watering with a fine rose will settle the ground round the seeds again, now rooting, and also assist in disposing of the very weakest. Watch the Orange butterfly which lays its small glossy egg on the point or just underneath the leaf. Do not allow the egg to become the grub by feeding on these seedlings. Go round once a day regularly, and look for eggs, or for the tiny, black, hairy grub, an eighth of an inch long when first noticeable as a grub. Do not allow it to reach the large brown-mottled stage, or the ultimate two to three-inch-long full-grown, evil-smelling green "Orange dog" (*Papilio demoleus, Linn.*)

Gradually harden the seedlings by removing the shade earlier in the afternoon, and replacing it a little later in the mornings, until they can stand the sun at full strength. Some days, of course, they will not need the shade at all. When they are about a year old (less, if rain has been plentiful), just as they are about to sprout again give the seed-bed a thorough soaking to soften the ground, and pull them up in handfulls, as required. As soon as they are pulled up, they are trimmed preparatory to being planted out in the nursery. Pull them straight up, not side-ways, and throw away every weakling not up to the best average standard. Discard every bent, knotted, or twisted root, choosing only the straight. Do not, from false economy, save any small or weak ones. What a *planter* wants is not "so many hundreds" or thousands, but future stocks, or future trees full of vitality for his own planting.

Trimming.—Different citrus varieties, as more fully detailed under "Soil-training," require at this stage an elementary root-training. Seville and pamplemous, which are great tap-root makers, must be treated now according to the depth and character of the soil in their future site. If that soil be shallow and irrigable, the objective is to make the tiny seedling produce furcated roots, by cutting back the tap-root to three and a half or four inches long, treating the top in the same way. Every hair root (laterals) on this four-inch root stump, should be cut off close with a sharp knife. By this plan, in planting out in the nursery, every root is compelled to grow straight, and there is no possibility of planting turned-up roots. The tree is thus *improved,* its growth capacity is increased, its root becomes more adaptable, is harder, and, so far from its vigour being impaired, it will outstrip another tree planted with a ball of earth, and make a better tree in a shorter time. Every turned-up lateral root is supported by their roots at the expense of growth, and a turned-up tap-root will dwarf or retard a tree for several years.

Seedling Sweet oranges and lemons should have a five-inch tap-root allowed them, but every other root should be cut off as bare as a pulled carrot. This may sound peculiar to those who think an orange a delicate tree, and no doubt a citrus tree moved at the wrong time is as bad as an apple tree moved in mid-summer, but a citrus will stand almost anything if the soil is moist and fine, and is just starting to grow at the time it is transplanted.

Transplanting.—To plant out in the nursery, having the garden line stretched, and the trimmed seedlings in a box or wet sack shaded from the sun, take a large carpenter's screw-driver in the right hand to make a straight up-right hole wherein to plant the seedling. Then, with the seedling held in this hole (at the proper depth—that is, about half-an-inch *lower* than it was in its seed-bed) between the finger and thumb of the left hand, make another hole two or three inches nearer the right elbow, and, with a quick push, lever the ground round the root now securely planted.

An attendant follows the planter with a water-can, and fills the last hole with water, from which the water percolates through to the tree just planted. Water them all again about half-an-hour later.

Three to four thousand a day can be planted by one planter, one waterer, and two to pull up and trim the roots, and every tree will live if kept moist.

A small dab of thick white-lead paint on the wound at the top should be put on the same day. It will be seen from this that each seedling is planted straight, that there is no possible chance of dwarfing, no shaking with the wind, no disease without being seen; and if the vigour was in to start with, it will be increased by the effort made by the seedling to grow another top, and become a tree again as good as possible. Never transplant a citrus tree when it has just *finished* growing and is ripening its wood, because *it must rest,* and transplanting it may retard it for months, doing it much harm.

Do not transplant while it is dormant. One never knows when it will move afterwards; the sap may be in the tree, but it is inactive. always wait for the first eyes or sprouts to show up in the branches. Never transplant a tree from ground quite dry and expect it to live; if the ground is like that, it must be soaked two days previous to transplanting, *even if the tree is starting to grow.* Grafted or budded trees cannot be pulled up in this manner; they will break off; these must be dug up and carefully lifted. All broken or twisted roots cut short off, as they will give trouble in later years. The tap-root needs careful consideration for its final move into its permanent site or *Transplanting into tins.* Many people object to having their trees put into paraffin tins, preferring to take the risk of bare roots. There is, of course, something to be said on both sides, but the paraffin tin carries some 75 points out of a possible hundred. An orange tree with bare roots is a bad carrier. It objects to water; it hates dry air. Its vigour and vitality lie in its sap, or, rather, in the state of activity in which that sap happens to be at the time it is dug out. Unless the sap has the speedy opportunity of spending itself in its own way, the vitality of such tree is impaired. The dormant stage is the best time for removing citrus trees that have to travel with packing round the roots.

Some nurserymen use moist ground to pot off their trees, and ram it fast in the tin with a short pole!

The best way to pot off trees is to use sifted ground (rich loam or rich sand) quite or nearly dry. Hold the tree in position with one hand, and with a large meal-scoop filled with sifted earth, pour in with the other hand on to the top of the roots until the tin is full. Shake it vigorously to settle the ground down, and three good waterings within the next hour will firm the ground round every root without damage, as the ground swells with the moisture.

Most small surface-feeding roots die if injured; it is, therefore, preferable to shake off *all* the ground, see what the roots actually look like, and the same man that trims the roots pots the tree, and fills the tin with earth, because he knows the position of the roots, and just what they require in the way of packing or shaking.

Trees potted off in this way with a well-drained tin *stood on good ground,* may be allowed to grow through the tin into the ground for a year if necessary; but it is very essential that the broken roots made in lifting the tin for removal, be carefully cut back to uninjured wood, also that they be removed at the very first indication of growth. The roots that have run round the tin should be straightened out in planting in the future orchard.

CHAPTER III.

STOCK AND SCION RELATIONSHIP.

The influence between the stock and the scion is said by every writer and authority on the subject to be mutual. This is an ambiguous term, hiding much that is misunderstood, under-estimated, and so far uninvestigated, but whereas a certain reciprocity does undoubtedly exist, the influences are diminished or strengthened commensurately with the potency of the factors then ruling and swaying both.

The influences of the stock and the scion are, however, widely divergent from the point of view of the fruit-grower, and as this book or treatise is intended to serve the purposes of practical utility, the preference will be given to that rather than devoting it to abstract science, which might be less useful to those it is my desire to benefit.

Take, for purposes of illustrating, *the influence of the scion,* the very common practice amongst farmers of grafting early and late peaches on the same stock; thus, I have under observation the common yellow St. Helena Peach, growing as a seedling four or five years old. On one side of it—after it has been cut down—I insert the earliest "November" peach, and on the other side, I graft the latest variety. It must be understood here that the scions of both the *early* and the *late* varieties were growing upon a similar St. Helena peach stock, the better to illustrate the influences at work.

The early peach will be noticed to start some months before the late peach shows any sign of activity. The usual time at which the St. Helena stock would have started is held or controlled by the scions now grafted; more particularly so at the second and third year's growth. Presently the late peach begins to grow, both obtain the nourishment they require, and flourish according to the unison existent between stock and scion, as will be found related under stock-influence. At the time the late peaches are blooming, the early variety is ripening its fruit.

If, instead of grafting the two varieties on *opposite* sides of the stock, we had grafted both together, only separated by the external bark of the two scions, the result would have been the same, namely, the early variety starting long before the later one. Such, therefore, cannot possibly be construed to indicate *stock* influence.

It is actually the influence of the scion, or the demands of the scion for sustenance upon the stock, which, proportionately to the congeniality or harmonious concordance existent between the scion (which has been grafted upon a stock not its own) and the stock, the stock can either fully respond to or but partially supply. (A seedling tree has such congeniality naturally supplied it, but a grafted tree is not a natural state, notwithstanding Botany discredits stock-influence.)

The Scion calls first. A root does not grow until the tree requests a response, but when discordance prevails, or when there is neither scion nor branch to call on the root, a single root, or the whole root possesses the faculty of exerting or asserting its influence to maintain life.

So long as unity prevails above the ground, so long is the root absolutely controlled and subservient to the branch system.

In connection with early and late fruits growing upon the same stock, there are some fascinating avenues opening out for experiment in the production of still earlier, and yet later varieties for which this country offers but little inducement to create.

In the light of the results following the "Masters' training system," it would seem to be indicated that plant life is of a far higher order than is generally supposed, being, to my mind, responsive, discriminative and assertive, and, in the interests of Horticulture, I would ask those possessing what I lack—training, wealth and leisure—to further explore the Creator's gifts to man.

Take as another illustration the thousands of failures in this country to grow Washington Navels and other pedigree varieties on the Seville stock. Every grower will admit that the Seville, as a seedling tree, and in suitable soil and moisture, is a hardy and vigorous grower, but no matter how hardy or vigorous it may be, its union* with a scion not in harmony with it, and unable to call on the stock for the food it needs, will either kill it in a few years or the stock will make its own effort to live as often as permitted to do so. It is possible to kill a Seville in eight months with a "very detestable scion," or it is equally easy by supplying a thoroughly sympathetic mate to make it out-grow every other Seville surrounding it.

The cause of the inability to grow Washington Navels on the Seville stock—apart from the phase of unsuitable conditions for the stock itself—is, that the stock having nothing in common with the scion cannot supply its demands for the particular nourishment it needs; and the scion seemingly fully aware of this gross incompatibility, and being unable to make its own roots, participates only in a fractional part of assimilative juices. This will be found more fully explained later on. There is another point of scientific interest for which I cannot account at present, namely, that whilst a Seville-grown scion often does well on a lemon stock, a lemon-grown scion does but poorly on a Seville stock. It seems only partly due to soil factors.

To sum up scion-influence, it should exert the same influence upon its "man-given" stock, as the natural branches of a seedling tree exert upon their own natural roots. Correspondingly, therefore, the nearer "scion-influence" shall approach the true fitness of things as ordained by Providence, so the need becomes proportionately less or greater for either stock or scion to exhibit detrimental dissimilarity.

---

* I would prefer saying "marriage," but fear the strictures of those who claim the right to know.

Stock-influence.—The true phase of stock-influence as concerns the fruit-grower will be found fully described in Chapter X., dealing with the lemon stock, also in Chapter V., but in order to connect "Scion and Stock relationship," it should be briefly mentioned here.

If a scion of any orange be singled out, and is grafted on to any stock, whether orange, pamplemous, or lemon, etc., and, later on, a scion be taken from the tree thus produced and grafted on to the most vigorous stock of the same sort again, the result will be found to give more vigorous growth and make a healthier, prettier tree altogether.

If for the third time it is done again, a tree is obtained, whose whole root-system has been altered or adapted to the scion, as well as additional growth made in its branches Simultaneously, however, with this enhanced growth (or unison) the true stock-influence becomes evident, the first indication being noticeable in the leaves, which have a distinct "stock" appearance, that is to say, they bear certain resemblances to the stock hitherto inconspicuous.

The ability of the scion to call upon and influence the stock, unfortunately for the fruit-grower, entails a corresponding reciprocal demand on the part of the stock to take its share in determining the quality of the juices supplying the fruit. This will be very clearly explained as we proceed.

Fruit-production of high excellence cannot, therefore, be secured with freedom of growth, unless stock-influence shall be favourably disposed to the juices of the fruit.

In the seedling orange tree a healthy and vigorous growth is assured by the perfect law of nature giving to root and branch their proper functions duly distributed and evenly balanced, but when man artificially imitates the office of nature, it is reasonable to assume that a modification or development of one faculty, as is done by grafting, must of necessity disturb another; and unless regulative methods can be devised whereby the one may be beneficially limited, it follows that the other must become thereby prejudicially affected.

As this statement, however, is quite contrary to established botanical science, the reasons and proofs will be given later on.

CHAPTER IV.

MAL-DI-GOMMA.

Its Effects.—Before dealing with Stock-influence proper, it seems necessary to insert an explanatory chapter on Root-rot in order that its influence on systematised Orange-culture—apart from disease—may become more fully understood and appreciated. The use of "stocks," it may be said was first shewn to be necessary by the ravages of

Mal-di-gomma, called also Root-rot, Collar-rot, Foot-rot, and Gum-disease, and a few words in explanation of the changes that followed this disease may go far to account for the present confusion and doubt under which much of the citrus industry of this Colony, more particularly in the Eastern Province, is still labouring.

Some writers fix the outbreak in Europe at 1845, from whence it gradually extended throughout the orange-growing world. Its history is irrelevant here, except in so far that with us in the Cape Colony, as with other places throughout the world, its advent marked the change from order in cultural methods to disorder and confusion following upon the change of *stocks* made necessary thereby.

Root-rot in this country is dealt with very fully on page 689 of the *Agricultural Journal,* December, 1897, by Mr. C. P. Lounsbury, who also cites its history according to American writers, and my object in mentioning it here is to shew that it was not until Root-rot disturbed the old order of things, and caused the introduction of *resistant stocks,* of whose behaviour in this country little if anything was known, that confusion crept in.

Root-rot broke the continuity of system, the success of which system was not known to lie in continuity, nevertheless, as will be seen later on, such has proved to be the case. Beyond this breakage of system, the effects of which are dealt with under "first-union grafting," "mongrelisation," etc., there lay the additional element of *cultural* confusion; by this I mean the planting of pamplemous and Seville stocks in dry, open soils, entirely unsuited to their root-systems, but which would suit the rough lemon, and sweet orange to perfection. Thus we find the pamplemous failing everywhere in all situations, other than rich, compact loams with abundant moisture in perpetuity, and the Seville hopelessly out-classed by the lemon and seedling orange, except where ample moisture was continuous, without which the Seville could not possibly thrive. On the face of it, it is, therefore, apparent that the mere fact of a stock being resistant to Root-rot, shews that its main feature consists in being able to resist the excess of moisture that engenders it.

It seems strange also that the distributing nurserymen of this country, who are quick to note the deciduous stocks requiring moist or dry situations, should treat Citrus trees as if their peculiarities in this respect were of little consequence.

Mal-di-gomma or Root-rot thus begat confusion; firstly, by breaking the sequence of stock-specialisation; secondly, by introducing an undesirable element I term "mongrelisation," about which more will be said later, and further by the failure to grasp the cultural essential that specific or fixed types of roots require specific soils and moisture secured and adapted to their feeding systems.

My impressions as regards the old systems of orange-growing throughout the world are that they invariably used a soil-trained, acclimatised, indigenous seedling orange as a stock for a similar or better class of orange, shewing in the light of my own investigations that scion and stock were in perfect affiliation one with the other, and that such specialised affiliation could be carried on for hundreds or thousands of years with no appreciable variation from standard type in either fruit or growth.

The difficulty experienced in newer countries in adapting high-grade oranges to *resistant* stocks, as yet not specialised by long use, may be said, therefore to lie in non-recognition *of the necessity for continuous system in orange-culture.*

A hypothetical phase of Root-rot, hitherto apparently overlooked, is the possible transmissibility from parent to seed of susceptibility to it.

It is known to every medical student that certain diseases are hereditary and transmitted in succession from father to son. Trees would seem to be no exception to the rule.

Root-rot may be in the ground, or again it may not be a specific disease at all; nevertheless, as long as the doubt exists as to its exact origin, it would give greater security if more care were exercised in selecting non-resistant varieties, by accepting as proof-positive the transmissibility of the disease to the seed.

Instances personally observed would seem to point out that this hypothetical phase was actual *fact,* in place of an open question, and assumed for argument only.

Seedlings planted from Root-rot killed parents in one district succumbed to Root-rot in another district, whilst healthy seed survived, or did not contract the disease.

Against this, may be cited the more frequent cases of *all* non-resistant trees dying unless remedial measures were instituted, which was not done in the case mentioned above.

Resistant Stocks.—In the effort made to grow oranges on stocks that will resist the disease, the system of budding and grafting on to Root-rot proof stocks has been resorted to.

So far as this country is concerned, such trees cannot be claimed to be Root-rot proof so long as the prevalent practice of low-down budding or grafting is continued; and if Root-rot is the specific disease many claim it to be, another outbreak may prove the *non*-resistancy of the trees grafted *above* them.

Root-rot often extends as high as a foot above the collar of the tree, and as most scions are only grafted from four to six inches above the surface of the nursery soil, moreover, as the exact whereabouts of the union is often a matter of doubt as time goes on, so they cannot be correctly classed as resistant *trees,* even if worked on to resistant *stocks.* The remedy seems obvious, as advocated by the Citrus Commission appointed by the Cape Colonial Government, the stock to be of practical use should be budded or grafted at least eighteen inches above the ground. "Low-down" and "high-up" grafting is dealt with in Chapter IX. on "Training," which should be referred to.

Further reference to Root-rot will be found in the appendix at the end of this book, dealing with prevention and cure.

CHAPTER V.

The Stock.

Stocks as Early Bearers.—The aspect of stocks chosen for the reason that they fruit earlier than the seedling, demands a few words of explanation.

In the light of past South African history, this belief, so far as concerns the adult trees and judged on the commercial basis of profit, has not always been justified, and many of those who once believed it have considerably modified their views after years of trial.

The facts of the argument, so far as they have appealed to me, may be summarised thus:—

A seedling tree is naturally a self-contained fruit-producer with perfect balance, having freedom of growth in root and branch, with fruit according to its kind, harmoniously ordained to be what it is in its physical structure by the Creator's providence.

Grafting on to a stock, unless that stock be an orange for a similar higher grade orange again, disturbs this physical concordance, and creates a bias for dwarfing, which is Nature's retaliatory measure for inequality.

Experiments have shewn that many trees grafted on to dissimilar stocks are thereby dwarfed, and although they bear earlier and often bi-annually, are inferior to the almost equally high-grade seedling in marketing capacity, acre for acre, as well as the fruit carrying the additional disadvantage of partaking after the inferior nature of the stock, if the stock has been unwisely chosen. This aspect is dealt with in Chapter XII. "The Science of Budding and Grafting."

The only method by which growth and balance can be secured militates against early bearing, but not more so than a layered tree Early bearing, therefore, in a great variety of instances, may be said to be attainable only by considerable forfeiture of wood-growth.

Trees grafted on the "Masters' system" bear very light crops for several years,* but good growth follows it.

If, however, the stock has been wisely chosen, that is a specialised scion for a specialised stock, in other words, an orange scion for another almost identical orange stock—the ultimate crop, although somewhat longer deferred, will produce high-grade pedigree oranges in greater commercial abundance.

---

* Bud variation excepted.

Stock-influence.—As the influences affecting seed were recounted in a personal way, so the facts that led up to the assessment of "stock-influence" may prove more interesting told in a similar way, and at the same time it may give a better opportunity to criticise (or study as the case may be) my observations and deductions.

Firstly, I feel bound to tender an apology for introducing a personal element in a book of this sort, as it may seem to many to be the grossest form of egotism, yet my failing does not lie that way.

For several years (not until 1903, when I first saw Mr. Mally), I refused to believe I had discovered *something new.* It seemed to me to savour of gross conceit and narrow-mindedness to claim credit for piecing a few simple facts together, which I wrongly concluded had been associated by thousands, years before I was born, yet, as my wanderings in pursuit of "Orange-knowledge" led me in contact with men whose fathers before them had been orange growing, as well as themselves, in various parts of the world, whose problems in citrus culture seemed often solvable at a glance, I gradually concluded that the study of citrus did not lie in concrete system, so much as it did in studying the laws of Nature which governed plant life. Mr. C. W. Mally, the former Eastern Province Entomologist of this Colony, a most talented American, in reporting upon a small beetle then ravaging the apricot trees on my farm, saw an orchard (citrus) just recently planted. In commenting on their growth and appearance, he convinced me I had accidentally found the point everyone had passed by, which was, as he termed it, "Stock-influence." He said no one had made a specific study of it, and to study that phase of horticulture had once been his greatest ambition, but circumstances had made him an entomologist. To use his own words, he said: "You have struck oil of the right sort, as the question was the foundation of fruit-production generally." Thereafter, he persistently worried me until he had extracted my promise to record my methods.

There are many people to whom citrus culture is a closed book, yet who understand apple culture in all its branches; therefore, I would like to introduce a substantiating by-proof (not of my own observation, but as told me by an English gentleman, who was visiting my farm), in order to shew that so far as concerns *apple* and *citrus* culture, both are controlled by the same natural governance.

I was relating some of the causes which gave me such abundant growth in citrus trees, in order to elicit an expression of opinion as to what he thought of the accuracy of my deductions. His reply was startling to me and tended to shew that the men who have the greatest opportunities of studying Nature at work were often merely working automata. By mentioning neither names nor localities, no offence could be taken from divulging what might be termed a family secret.

The story is as follows: In his large fruit-garden in England he had an apple-tree that carried its fruit till Christmas every year, and it was produced many years ago in the following manner. From the many other varieties of apple trees growing in the same garden, in the same kind of soil, the seeds of one are chosen to plant for stocks. The next season these stocks, three in number, will have grown sufficiently to graft No. 1.

A scion from another tree is grafted on to this No. 1, which becomes a dwarf, and after it has served its purpose (which is to supply a scion for grafting) is thrown out. The following year a scion from this No. 1 tree, is grafted on to a No. 2 stock, which also, after it has served its purpose, is thrown away. The following year a scion from this No. 2 is grafted on to the third stock, which becomes the finished "Christmas" tree.

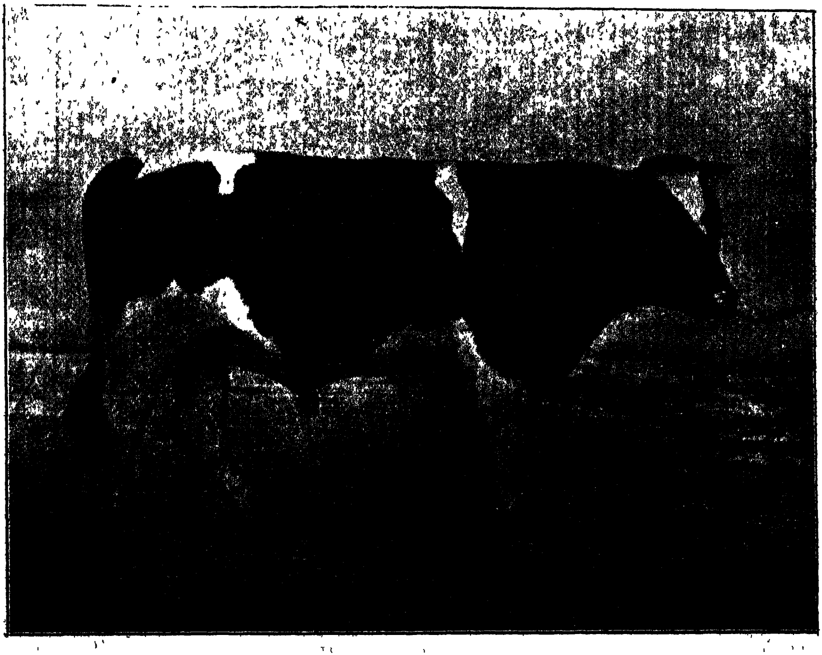
This tree has no resemblance whatever to the original "stock" tree, or the tree from which the first scion was taken; neither of these were *late* varieties, nor were either of them marked by the peculiarities of the "Christmas" apple. He said his gardeners had handed the secret down from father to son, and he had found it out from them when a young man. In reply to my question: "Why not have planted more stocks the second year, and have used the No. 2 scion as the propagator for the lot?" he said the idea had possibly never struck them; it seemed reasonable enough to suppose it would have the same result, but he would not like to see the tree too common! In reply to a further question as to why he grafted *three times* on the same stock, he said that the first one was a stunted dwarf, and the second one, although a better grower, was only half as good as the third.

This was told me as a remarkable coincidence in a confidential conversation.

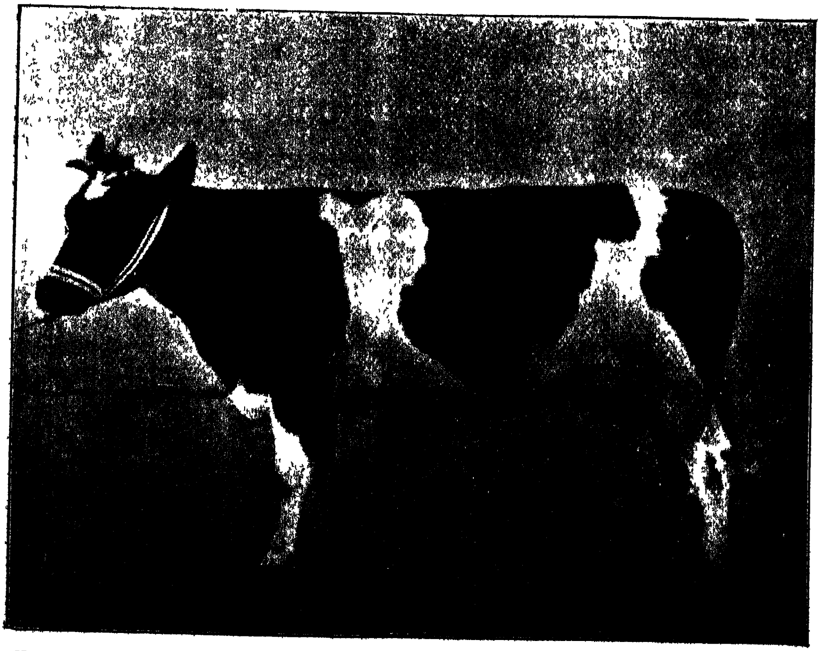
Here are two facts perfectly evident: Firstly, that "bees" or cross-pollination played no part in forming the new variety; and, secondly, that *soil* factors could not be said to have caused the enhanced growth at "third-union," thus, if there was any truth in this gentleman's statement—and let me say here that his experience was a simple corroboration of my own—then the result must be solely attributable to *stock-influence*.

(To be continued).

East Frisian Red and White Cow, "Luise 7599," photographed at 6 years of age.



East Frisian Black and White Bull, "Primus," photographed at 1 year of age.



East Frisian Black and White Cow, "Siegerin," photographed at 6 years of age.

East Frisian Black and White Heifer, "Fanni," photographed at [illegible] years of age.

STUD STOCK FROM GERMANY.

OLDENBURG HORSES, FRIESLAND CATTLE AND MERINO SHEEP.

Dr. Adolph Wegner-Norden, a recent visitor from Germany, informs us that he has come out representing large agricultural interests in Germany, who are desirous of introducing their high class stud stock to South Africa. As a beginning, one East Frisian stallion, two East Frisian bulls (black and white), with four cows and six Saxony Merino rams are being landed, and will be on exhibition at the Rosebank Show as an example of the class of stock proposed to be introduced. Dr. Wegner-Norden has come out under the auspices of the Imperial Agricultural Association of Germany, and all the stock introduced may be relied upon to be exactly what it is represented to be. We have not been able to procure photographs of the actual animals which will be exhibited at Rosebank, but herewith we give illustrations shewing typical animals of each class.

East Friesland Cattle.

The East Friesland cattle has been referred to in previous issues of the *Agricultural Journal* as a type that should prove suitable for dairying purposes in this Colony. There are three classes of these—the red and white, black and white, and reddish brown. Of these the black and white has been selected to introduce the breed here as more likely to suit the taste of our farmers.

The first aim of the East Frisian breeders is to produce a good milk-giver. Fully aware, however, that a one-sided breeding for the production of milk alone will injure the health of an animal, they have not gone to the extreme in this direction, but proper attention is given to the development of a strong body, having power of resistance, and to the production of beef, the latter, however, to a certain degree only.

Milk-giving Powers.

Among the milk—and beef—producing types of Germany, the East Frisian cattle take first rank, which is shewn by the fact that cattle from East Friesland are sent every year to all parts of Germany, where cattle are bred, in order to obtain a better type of animal.

The Secretary of Agriculture, Mr. Wychgram, of Wybelsum, examined for one year, 1895-6, 70 black and white cows in regard to their milk-producing qualities, and found that

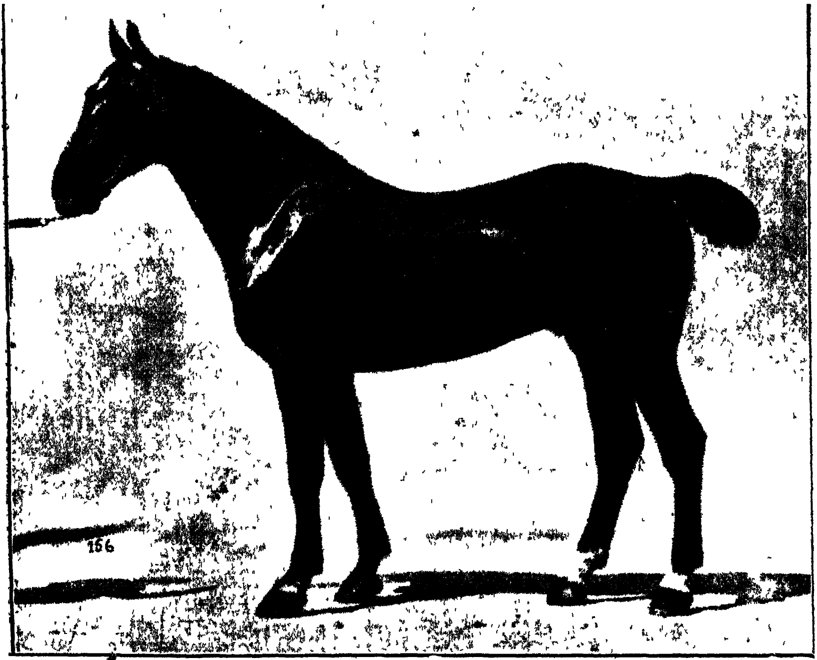
3	cows	produced	over 5,000	kg	milk	with	3·35	%	fat
9	„	„ from	4,500—5,000	„	„	„	3·09	„	„
5	„	„ „	4,000—4,500	„	„	„	3·41	„	„
15	„	„ „	3,500—4,000	„	„	„	3·04	„	„
8	„	„ „	3,000—3,500	„	„	„	3·08	„	„
17	„	„ „	2,500—3,000	„	„	„	3·06	„	„
13	„	„	under 2,500	„	„	„	3·06	„	„
40	„	„	over 3,000	„	„	„	3·14	„	„
30	„	„	under 3,000	„	„	„	3·06	„	„
			per cow 3,366	„	„	„	3·11	„	„

The amount of butter received varied from 111 to 452 lbs. per head.

Mr. Wychgram (member of Council of Agriculture) found also that cows seven years of age were the best milk-givers.

It was also proven for the first time by a large number of cows that the ability to produce milk rich in fat or poor in fat is transmitted to the offspring.

How much the milk-giving qualities may be raised under favourable conditions was shewn in the year 1896-7 by the Royal Prussian Ministry of Agriculture in a test milking of the black and white and red and white low-land cattle. The Breeders' Union of East Frisian pure-bred cattle was represented at this test milking by 26 of their registered animals, which carried off the victory on that occasion.



Oldenburg Stallion, "Champion II."

3 year old Oldenburg Filly, "Minorka 11441."

Rambouillet Ram, Robust-woolled, Bred in Saxony.

Rambouillet Ram, Fine-woolled, Bred in Saxony.

MOLTENO DRIFT SANDS AND THEIR RECLAMATION.

By James Sim, District Forest Officer, King William's Town.

The following report by Mr. James Sim, District Forest Officer, King William's Town, on the Molteno Drift Sands, should prove interesting reading to those in other parts whose farm properties are threatened:—

On the 5th December I visited the site of a reclaimed drift sand in Mr. Vice's plantation, and found that the trees planted on the site of the drift shewed much more vigorous growth than those on the adjoining area. This drift, which has covered about ten morgen, is now completely reclaimed and the larger part of it planted with pines

On the 6th, accompanied by Mr. Brown, I proceeded to Twee Rivier, and inspected a small drift on that farm. This drift was undoubtedly caused by injudicious ploughing of sandy soil on a neck where the wind sweeps between two kopjes. The prevailing wind, however, has carried the sand against a krantz, so that the danger of further drifting appears to be past.

On enquiry I found that almost all the drifts were of the same nature, caused by injudicious ploughing in dry seasons on exposed positions, all of comparatively small extent with the exception of the drift at Oudeklip, which is a very extensive one.

Mr. George Vice informed me that he remembered some 40 years ago being asked to go and see a peculiar spring at this place, from which water had ceased to flow, and from which sand was issuing and being constantly blown away. Some ten years later he again visited the spot, and the sand was still emerging from the spring, and was covering several acres of ground, and that a young willow tree close by was about covered.

On the 7th December I visited this drift, which now covers, aproximately, 700 morgen. My guide, young Mr. Van Zijl, of Oudeklip, was unable to shew me the site of the origin of the sand mentioned by Mr. Vice, but informed me that no sand now came from any such source.

The drift originated and is almost entirely on the farm Riet Kuil, in the Burghersdorp district, but has crossed on to the farm Wonderboom, and is threatening Oudeklip on the one side, and the farm Drooge Vlakte on the other.

The drift originates at a point near the Wonderboom River, and widens out along the flats like a fan, until it comes in contact with a high kopje, when it divides, one half encroaching on Wonderboom and Oudeklip, and the other proceeding up a narrow valley to a nek overlooking Drooge Vlakte.

The original source of supply appears to be exhausted, and the lower portion of this area is destitute of sand, soil or vegetation. On the lower portion, however, sand in large dunes up to 20 feet occur at intervals all over the area, except in the front, where the sand is only covering the grass. No note has been taken as to the speed at which the drift is moving, but I was informed that during the late dry years it was much more rapid than formerly.

On many of the dunes a small grass and a rush are struggling for existence in spite of the fact that stock have free run over the whole area.

These sand drifts are a most serious matter, as not only in this, but in adjoining districts they are becoming of frequent occurrence, and Mr. Clark, of Dordrecht, informed me that he knew of several in that district, one of which covered at least 100 to 150 morgen.

So long as they are small it is an easy matter to check these drifts, and I was shewn two which had been arrested, one on Mr. Vice's farm by means of tree planting stopping the source of supply and arresting its further progress in a sheltered position by a bank and ditch, the other on Wonderboom, which had originated from a road on the open veld. Mr. Van Zijl, on acquiring this property, at once fenced off the drift about four morgen, and spread a few bushes, about a waggon load on the shifting portion of the sand, and at the same time sowing grass, lucerne and weeds, with the result that the drift is now entirely arrested. I suggested that the grass should be reaped when the seed is ripe and spread on the patches which are still bare. The experience in these cases shews conclusively that if taken in time their reclamation is well within the scope of the farmers themselves, and I am not aware of any law at present by which a man can be compelled to stop a sand drift on his property, but it appears to me that it is high time some enactment was passed dealing with this matter.

I did not see the owner of Reit Kuil (Mr. Henning), as he does not live at this farm, but I was informed that he declines to do anything in the matter, as he believes that the drift will die out and form bush veld. Eventually this may be so, but meantime the whole place is a howling wilderness—the drifts spreading.

In order to arrest the sand and prevent its encroachment on Drooge Vlakte, I recommended that a rough stone wall should be erected for a distance of about 100 yards across the neck, so as to form a littoral dune. Stones are plentiful, and such a dune could be formed cheaply, and raised by adding a few stones when the sand overtops the wall. The neck is high, however and I do not think much will be required to keep the quantity of sand in check.

On Wonderboom, which is flat ground, I advised Mr. Van Zijl to surround the drift by a fence, and to keep stock from trespassing, and to lace into the fence a few besom bushes so as to check the approaching sand.

It is, however, absolutely necessary in order to ensure the success of these efforts that the whole of the drift on Riet Kuil be fenced, and stock of all kinds rigidly excluded, and so reduce the sand movement as much as possible.

I believe that even this area could be reclaimed by the farmer himself if care were taken.

THE CAUSES OF DRIFT SANDS.

In order to give any clear suggestions with regard to the prevention and reclamation of such drifts we must first consider the usual causes from which they originate.

The following are some of the commonest:—

1. Injudicious cultivation of land during dry seasons on spots exposed to peculiarly strong wind from the prevailing direction, and the continuation of any cultivation after sand movement is discernible.
2. Injudicious kraaling of stock on sandy soil on exposed positions.
3. The practice of allowing stock of all kinds to roam at will over large areas of veld during the whole season, and thus giving the grasses and vegetation no opportunity to recover themselves, or shed seed.
4. The indiscriminate formation of roads or tracks across the veld without due precautions to insure against sand movement. (The small drift on Wonderboom originated from such cause.)
5. In some cases the sand may originate from some peculiar source of supply, such as that mentioned by Mr. Vice, but such cases are few.

The spread of the sand is due to the prevailing wind, which being from north-west, is almost always dry and frequently hot. It is strongest and consequently the danger of sand movement greatest during the months of July, August and September.

The whole soil of the district is light and sandy, and is liable to blow unless covered with vegetation.

PREVENTION AND RECLAMATION.

I would make the following suggestions as to the means to be taken for their prevention and reclamation:—

The best possible prevention is to keep the soil well covered with vegetation, and in order to do so I would recommend the sub-division of all farms into a number of camps to be grazed in rotation. This allows all the better class of herbage to have a chance to recover itself and shed seed, which is not the case when it is constantly grazed and trampled. Some leading farmers consider that a portion should be left ungrazed each season so as to allow ample time for recuperation and seed shedding. This would not entail any diminution of the number of stock kept, but rather the reverse, and the danger of sand drifting would be minimised.

The selection of kraal sites should receive careful consideration. Most of the drifts, however, arise from injudicious cultivation, and care should be exercised in the selection of a site for lands, and any portion shewing a disposition to blow, steps should be taken to check its progress by covering it with vegetation.

Probably the most important step towards the prevention of drifts, and one which is almost always left undone by farmers, is the formation of shelter belts of trees planted at right angles to the prevailing winds.

Mr. Vice has proved that in the Molteno District this is possible. The sandy soil is suitable for pines, and these make the best possible shelter belts. The ground must be cultivated, and the trees planted during the wet season. The belts should form a strip from 10 to 20 yards broad, and the trees planted in rows six feet apart and about three feet apart in the rows. These should be planted quincunx fashion, thus:—

* * * * * * * *

 * * * * * * *

* * * * * * * *

Pinus halepensis is probably the most suitable tree for this district, but as it grows slowly it might be advisable to plant, say, three lines alternating with a quicker variety, *Pinus insignis,* and the other lines pure *Pinus halepensis.*

The reclamation of drifts already started is most important. The first step towards this end is the fencing of the whole area covered, or likely to be covered, with sand, and the total exclusion of stock of all kinds.

When this has been attended to, a strenuous attempt should be made to get the soil covered with vegetation. One important factor must not be lost sight of which assists in this way if stock is excluded, but is a source of danger while stock are allowed free run, that is that at first the light coating of sand acts as a mulch and the growth on the outskirts of a drift is usually more vigorous than on the adjoining veld. It is immaterial what varieties are used, and is usually safe to use plants known to do well in the district in preference to exotics.

The herbage which is already growing in the drift, such as the small grass and rush on Riet Kuil should be encouraged, and the seed collected and sown. Rushes, when obtainable, should be spread on any portions where sand is moving, so as to arrest its progress. These bushes should be laid with their butts to windward, when they will become firmly fixed with the slight movement of the sand among them.

As suggested for Oudeklip, every endeavour should be made to stop the further progress of the sand, or to turn the course into an adjacent kopje—stone walls or bushed fences being the best means available.

The planting of trees over part of the area is also worthy of consideration. Little cultivation is necessary as the soil is already loose. Planting should begin to windward, and along the outside in the form of a horseshoe, and follow the course of the drift *Pinus halepensis* is without doubt the safest tree to plant, but, as already stated, it is slow; therefore, I would recommend that a belt of *Pinus insignis* be planted to windward within which *Pinus pinaster* and *Pinus halepensis* would be most suitable. Simultaneously to cover the barren sands with vegetation by planting Marram and other grasses, lucerne, etc., and by sowing seeds of such indigenous plants as can be induced to grow.

The fences should not be removed when the reclamation appears to be complete, but retained in order to form a camp in which stock can be placed and withdrawn at discretion.

It is, however, a serious question why such drifts should be allowed to occur. As previously shewn, they can, in their infancy, be easily arrested, and I would suggest that by an Act of Parliament such cases of neglect which might lead to disastrous results should be made a criminal offence.

MR. CLAUDE FULLER'S "FRUIT GROWER'S HANDBOOK."*

By P. R. Malleson, Cape Orchard Company.

I must congratulate Mr. Claude Fuller, Government Entomologist, Natal, on his excellent Handbook on Fruit Growing. It is seldom that I have met with a book on the usually dry subject of fruit growing written in such pleasing and interesting language. In his preface, the author says:—"I have not hesitated to make use of all the works at my disposal," and I admire the way in which he has worked in long extracts from other works in such a way that it becomes one homogeneous whole. Mr. Fuller has been able in this short book to weave science with practice into a book which school children could understand and yet be of practical value to the fruit grower.

At the first glance the early chapters seem to be devoted to what growers generally describe as "theory," otherwise botany and geology; but the orchardist will find many shrewd, practical hints interspersed with the theory. To give an example of this, I will quote from the first chapter, in which the author describes, among other things, the action and nature of roots. He says: "The soil is tilled and broken up, first so that the roots may feed over as wide an area as possible; second, that the rains may penetrate the more easily; and third that there may be a good admixture of air with the soil. In a well-cultivated soil there should be, bulk for bulk, an equal quantity of air and solid matter for the well being of the plant, and further, apart from the absolute need for water and air, these two elements together tend to break up and disintegrate the earth particles, and liberate the many chemicals which the plant requires." This quotation seems to me to put into a nutshell all the reasons for cultivation among the trees of an orchard, and Mr. Fuller has the knack of putting all his reasons for the different farming operations into the same short, concise phrases.

In the same chapter I must draw attention to the description of the formation of fruit buds which should be carefully read by all who wish to increase their fruit crops. All farmers should appreciate Mr. Fuller's comparison of the production of high class fruit and the breeding of thoroughbred stock to be found in the second chapter.

---

*A Fruit Grower's Handbook of the Culture and Management of Fruit Trees, by Claude Fuller. The Times Printing and Publishing Co., Maritzburg, Natal. Cape Town: T. Maskew Miller.

Though I fully agree with this writer in insisting on the importance of draining, after a fairly wide personal experience of draining land for fruit, both in England and South Africa, I have come to the conclusion that the open ditch is more satisfactory, especially in alluvial soils, than tile and stone drains for this country of torrential rains. I have personally had to give up both tile and stone drains for deep, open ditches, cut diagonally across the water shed; but it must be admitted that, in soils which permit of it, his system is the correct one.

Mr. Fuller's remarks on planting and manuring are excellent, and may be safely followed. The general rules laid down for pruning are also good, but the author has got rather involved in his definition of summer pruning.

The chapters on renovating old trees, budding and grafting are all that could be desired. He has been wise in not going too fully into the picking of fruit for market and export, which can only be learned by practical experience. I must, however, differ from him when he says that for export, fruit should be "ripe, not mature." Now, I should say "the fruit should be mature, not ripe," meaning by the word mature that the fruit should have attained its full size, and be in all respects a perfect fruit, but that the final ripening or sweetening of the fruit had not taken place. I agree with all Mr. Fuller's remarks on thinning, except that I prefer two thinnings, one before and one after stoning, to his one, as I have found by this means the best crop combined with size is obtained.

On the subject of pruning the various sorts of trees, it is notorious that no two fruit men ever agree, so naturally I cannot accept all Mr. Fuller says on this subject. But I must allow that his theory is on the whole sound, and his remarks on the general treatment of trees correct.

I regret, however, that the author has left two difficult and important subjects severely alone. First, the irrigation of fruit trees when the rainfall is insufficient to grow fruit without the help of irrigation; and second, the practical treatment of insect pests and fungoid diseases, which would come with especial interest from Mr. Fuller. Finally, I should like to recommend Mr. Fuller's book to be used as a text book for advanced schools, where technical instruction is given, and to the notice of all fruit growers. The work is well printed and replete with useful diagrams and illustrations.

AN AGRICULTURAL CREDIT SYSTEM FOR CAPE COLONY.

The Treasury has issued a pamphlet under the above heading dealing with a proposal which is outlined for the establishment of a system of agricultural banks under the ægis of the State. On the outer cover it is stated that correspondence is invited, letters to be addressed to the Treasurer of the Colony, Cape Town. From this publication we gather that the Government intend, during next session of Parliament, to introduce a measure dealing with this question, and the pamphlet is published in order to give full time for its consideration and discussion. The information given is very full and comprehensive as to the system adopted in the Australian Colonies and New Zealand, and it also gives the general lines upon which it is proposed to found legislation in this Colony.

The pamphlet in question begins by discussing the present position of this Colony from the productive standpoint, and says that we now find ourselves: (a) Importing large quantities of foodstuffs which could, and should be, produced in the country; (b) with very many thousands of acres of land which could, and should, be under close cultivation; (c) with many hundreds of miles of non-paying railways; (d) with a debt which, though not excessive, can only be met by making full use of the resources of the country; (e) with little organisation for marketing farm produce.

"Granted these conditions, what should be the policy of the country? We should proceed systematically to increase our production to its utmost capacity. We should aim in the first place to supply our own wants and the South African markets, and in the second to produce a surplus to ship to the markets of the world. We should perfect our means of distributing produce so as to bring producer and consumer into close touch. By doing this we shall incidentally help the railways by creating traffic for them; but our main advantage will be in the increase to the wealth of the country by increased production.

"Before discussing the methods adopted in other countries for dealing with the problems which beset us in the Cape Colony, it may be well to realise that we have special conditions to face here, and special circumstances which must be met. In the first place we have a great variety of land, and necessarily a great variety of farming methods. We have land that is capable of close farming and thorough cultivation and land which probably will never be more than poor grazing veld, land that will yield market and dairy produce and fruit, and land that will yield wool, mohair, ostrich feathers, and meat. We have, therefore, to consider a wider problem than one of market gardening only, and any scheme applied to this Colony should be applicable to the whole country and to its varied conditions.

"Let us deal at once with the objection that in adopting special measures to aid the farming industry of the country we are acting unfairly by the balance of the population not engaged in farming. The answer to that contention is that the permanent prosperity of the country rests upon its agricultural development, that trade and commerce are directly concerned in the prosperity of agriculture in all its branches, that the town populations, railway employees, public servants, and harbour employees are directly concerned, and that the mining industry is almost equally interested, since it will directly benefit from the decreased cost of food supplies. The necessity of the adoption of special measures for the development of our agricultural resources is the basis for this policy now advocated. It is the question submitted to the country for its decision.

"It is hardly necessary to repeat the commonplace that such a development demands two things: labour and capital. In this Colony we need only consider the second of these requirements, for we already have a population on the land—a growing population—and we have, moreover, a natural bent in our people towards the land. What is termed the poor white question we can leave aside for the moment, though it forms an essential part of the subject. In the first place, we have to deal with the closer cultivation of land now occupied and inadequately cultivated by a population which for the most part may be described rather as a struggling than a prosperous population. What are the reasons which prevent these men from increasing the productiveness of the land and from supplying at least the local demand for food? We may pass by the frequently repeated and stale libel against the lack of enterprise and lack of industry on the part of the South African farmer. The races from which the farmers of South Africa spring have proved their worth in these respects. If the farmer is shewn a field for productive labour he will take advantage of it and profit by it. He has been paralysed for want of transport, for want of organisation for distribution, and by other causes; but the main drawback has been lack of capital and the heavy charges for capital, which have crippled enterprise. Few farmers have much capital, and the man who wants to buy a farm in the Cape Colony almost invariably finds it necessary to borrow on the security of the farm a considerable portion of the purchase money. He is again met with the want of capital for the necessary live stock and farm plant; and before he commences his farming operations he is heavily in debt. That is the case all the world over, and there is nothing unhealthy or unsound in such a position. Everything depends upon the rate of interest a man pays. With heavy interest, the man struggles for years, barely living. All his energies are required to meet his recurring liabilities, and he is seldom able to put aside enough to provide for new enterprise, which inevitably demands fresh capital.

"The question of interest is one upon which most farmers can speak. Very few farmers pay less interest on first mortgage than 6 per cent., while further borrowings cost them more, how much more will depend entirely upon local conditions; but cases are common where the rate of interest is so onerous that both land and farmer are starved. The main incubus upon the farmer is the interest he has to pay. This more than any other is the cause of the lack of enterprise and absence of successful effort to meet the demands of the country. This more than any other is the cause of our slow and painful agricultural development. It will be well to state that there is no intention of advocating any system of easy and thoughtless borrowing, and it is not necessary to stop to enlarge upon the disaster which would inevitably follow upon any such course. The problem which faces us, however, is no new one. It has been faced and solved by other countries, and it is necessary to see what measures those other countries have undertaken and what success they have achieved."

The pamphlet here gives some facts regarding the system in other Colonies, setting forth: The purposes for which advances were made; the persons to whom advances are made; the security demanded; the limits of the advance; the interest charged; the terms of repayment; the sums raised or authorised by the Australian and New Zealand Governments; the methods of management and control; the manner in which the funds were raised; the amounts advanced; the sums repaid; the sums not repaid necessitating foreclosure; the number of advances made; the average amount of each advance; the sum advanced per acre of land; and the cost of administration.

It goes on:—

"If this information is summarised, it will be found that the objects sought to be obtained by the Australian Colonies and New Zealand were to increase the production of the land by assisting farmers to undertake legitimate and reproductive enterprises by advancing the necessary money at the lowest possible rate of interest and by extending the term of payment over a stated period. It is not proposed to deal with the system adopted in some cases under which loans were also made from State funds for other than agricultural development. It is only intended to consider the proposal to advance the necessary capital to farmers in such a form as may best help them and on sound business lines.

"We find from the information recorded that the security demanded in all cases is a first mortgage or the equivalent of a first mortgage, and that in none of the Colonies dealt with has it been thought safe to depart from that principle. It will be seen that the limits of the advance vary considerably from £800 in Queensland to £5,000 in South Australia. The limit, in fact, depends upon the conditions prevailing in the various Colonies. Regarding interest and repayment, there are considerable differences. The interest varies from 4½ to 5 per cent., while the term of repayment extends to 40 years. The movement of interest has been in an upward direction. The sums authorised and loaned vary from £250,000 in the case of Queensland, to £4,000,000 in the case of New Zealand, as do the sums actually advanced. It is seen that Queensland has other loan Acts in operation, under which large sums have been loaned. The figures shew the total amounts advanced and the sums repaid, and the outstanding advances are now as follows:—

	Advanced.	Repaid.
Western Australia	£297,600	£47,097
South Australia	1,011,110	408,744
New South Wales	628,353	217,080
Queensland	97,523	3,255
Victoria	2,021,333	692,785
New Zealand	4,922,630	1,795,643
	£8,978,549	£3,164,604

"Roughly, it may be said that the Australian Colonies and New Zealand have advanced £9,000,000, that £3,000,000 have been repaid, and that £6,000,000 are now outstanding. This means, of course, that the margin of security is very much greater to-day than at the time the advance was made, because though in some cases the advance has been entirely paid off, yet in the bulk of cases the loan has only been reduced. The State, therefore, while holding the full security, has very much less than the original sum advanced upon it.

MANAGEMENT AND CONTROL.

"These, it will be seen, differ materially in the several States. We have in the case of New Zealand and New South Wales a Government Advance Department, more or less controlled by a Board appointed by the Government; while in Western Australia, South Australia and Queensland we have a State bank created with statutory powers for raising money, management, etc., and in Victoria we find the whole management centred in the Sinking Fund Commissioners, who have statutory powers to raise money and advance. In the raising of the funds we find that in the case of Western Australia, South Australia, New South Wales, Queensland, and Victoria, the Government authorized the raising of funds by the issue of specially guaranteed mortgage bonds or stock, as occasion required; while in the case of New Zealand the Government raised a loan in the London market in the ordinary manner and advanced the money under its regulations.

"In every case the reports speak highly of the results of the system and its stimulating effect upon the agricultural production of the country. Here again figures speak more forcibly than any language, and the growth of the exports of agricultural produce from the Colonies during the period in which the system has been in operation is of interest.

SCHEME FOR THE CAPE.

"It is not proposed here to outline a cut and dried scheme in the form of an Act of Parliament. What is proposed is to submit for the consideration of Cape Colonists suggestions for such a scheme, to invite criticism and discussion, and to enable the Government, as a result of such discussion, to formulate a Bill to be laid before Parliament at its coming session. It is the intention of the Government to introduce legislation dealing with the question next session, but as the matter affects the welfare of the whole country, before legislation is introduced, and before asking Parliament to take definite action in the adoption of so important a policy, it will be to the advantage of the country to have full time and opportunity to consider and discuss the subject in all its bearings. Such a discussion will be of material assistance to Parliament, and members will be able to ascertain the views of their constituents before Parliament meets.

"1. It is suggested then in the first place that it will be to the advantage of Cape Colony to adopt the principle of giving loans to individual farmers and co-operative associations of farmers upon such terms as shall stimulate agricultural and pastoral industry.

"2. It is suggested that the loans should be granted for the following purposes:—(a) To pay off existing liabilities in cases where the Board aproves of the proposed improvements; (b) to effect improvements, including (1) water storing and leading, (2) fencing, (3) clearing land for agriculture, (4) planting of orchards and vineyards, (5) farm buildings; (c) purchase of stock and plant.

"3. It is suggested that the security in each case shall be a first mortgage upon the land, or in the case of leasehold property, such security as the Board shall think fit. In each case the Board shall make an independent valuation of the land, and the advance shall in no case exceed two-thirds of the total value of the land, with the improvements, etc., for which the advance is sought. The Board to have absolute power to accept or refuse any application.

"4. It is suggested that loans should not be granted for a sum less than £50, nor for a larger sum than £5,000, without the special consent of both Houses of Parliament. The object being to encourage the working farmer of small means rather than the larger landowner, and to stimulate the closer settlement of the land.

"5. It is suggested that the interest charged shall be 5 per cent., or if paid within fourteen days of the due date, to be 4½ per cent., a rate that should cover the actual interest to be paid as well as the working office expenses. In addition to the interest, the borrower shall pay the actual cost of the loan, expenses of valuation, etc. Beyond this there should be no charge for preparing the bonds, beyond the cost of registration, unless special legal expenses have to be incurred. The mortgage bonds, also, should be free from stamp duty.

"6. The terms of repayment should vary with the nature of the loan; but in no case should they be extended beyond 40 years.

"7. It is suggested that in the first place the amount authorized to be raised should not exceed one million sterling.

"8. With regard to the management and control, it is suggested that the soundest method is that of creating an Agricultural State Bank, controlled by a Board nominated by the Government, with the approval of Parliament, and governed by regulations which have received Parliamentary sanction. If a system of agricultural loans were directly under the control of Government, it would be almost impossible to dissociate it from political influence, and certainly it would be hampered in its work by the suggestion of political influence. The Board, when appointed, should have full statutory powers to accept or refuse any proposal without interference from the Government of the day, and the members of the Board should, after appointment, only be removed from office by a direct vote of both Houses of Parliament. The Board, too, should take control of all loans and advances made in this Colony under various Acts of Parliament, and from the date of its appointment all loans granted should be under the terms of the Act.

"The regulations should give the Board power to insist, where necessary, upon the insurance of live stock, and the insurance against fire of farm buildings, etc., also the power to take possession of land or property should the borrower be in arrears with the payment of sinking fund or interest. The Board further should have powers of inspection and the right to insist upon the proper maintenance of all property upon which advances have been made, and in case of failure on the part of the borrower, the Board to have the right to execute repairs at his expense.

"The Board should have authority to issue mortgage bonds bearing interest at a rate of not exceeding 4 per cent., and to an amount not exceeding one million sterling. Such bonds to be secured by the State and to have such currency as the Government may think fit.

"The following persons should be disqualified from serving on the Board: Members of either House of Legislature, directors, managers, or officials of any bank, company, or association dealing with the lending of money, and no advance may be made to any member of the Board, nor upon any property, in which a member of the Board is directly or indirectly interested.

"Annual statements should be issued by the Board shewing:—(a) Transactions of the Board for the preceding year; (b) the total amount of loans issued, purposes for which they were issued, the total amount repaid, the total amount outstanding, the instalments and interest overdue and unpaid, the number of advances and average amount of each advance, the number of applications received, for the year, the valuation of the loans outstanding; (c) a balance sheet, together with a profit and loss account, for the year; together with such other information as the Government may direct."

POISONED BAIT FOR THE FRUIT FLY.

By T. F. DREYER, B.A., Assistant to Entomologist.

The Fruit Fly (*Ceratitis capitata* Wied.), despite the serious losses which it inflicts on fruit growers, and the consequent constant attentions of economic entomologists, is still one of the pests which can be controlled only to a very slight extent. Control methods that have been used in this country will be found discussed by the late Eastern Province Entomologist (C. W. Mally, M.Sc.) in the *Agricultural Journal* of December, 1904 (Vol. xxv., No. 6). These consist in the destruction of fallen fruit and in covering the trees with light cotton netting of ten meshes to the linear inch. In the same article Mr. Mally also suggests that poisoned bait might prove of value, and gives the following mixture as such a bait to be sprayed coarsely on the trees to be protected:—

1 lb. arsenate of lead,
25 gallons of water,
5 gallons of treacle.

This mixture he found to adhere well, and also to remain soft enough for the flies to remove it readily. It was tried on various farms around Grahamstown by Mr. Mally in the season 1904-5, but his results were nullified by the great scarcity of the flies.

Mr. Mally's successor, Mr. W. R. Dewar, continued these experiments during the 1905-6 season. He commenced operations with a mixture composed of 1 lb. of arsenate of lead, 25 gallons of water, and 7 lbs. of treacle, but found that when the water evaporated, the film of treacle was too thin to allow the flies to remove it readily; he accordingly gradually increased the proportion of treacle till it reached 18 lbs. This mixture he found to give the best adhesive results, and also to give a thick film of treacle which would remain soft for a considerable time. Owing to an invasion of fruit moth in January, 1906, his results were not conclusive, but they were most encouraging.

Afterwards at Sunnyside, near Grahamstown, where the mixture was used, there was no trouble with the pest in the apples, while other farms all over the Eastern Province suffered more heavily, as regards apples, than they had ever done before; whole crops were in some cases ruined by the Fruit Fly.

This season (1906-7), Mr. Dewar is continuing in Albany the spraying with the same mixture, but owing to continual rains his work so far has been nullified. He also mentions that the fly is very scarce in Albany this year again.

Poisoned bait for the Fruit Fly seems also to have exercised the minds of entomologists in Europe. Professor Antonio Berlese, of Florence, Italy, has issued a pamphlet giving the results of experiments with the Olive Fly (*Dacus oleae* Rossi), and he suggests that the same method may be efficient for the Fruit Fly. The following is a free translation of this pamphlet, for which we have to thank the courtesy of the acting Italian Vice-Consul.

> It is a long time now since entomologists and fruit growers . . . . first endeavoured to discover some satisfactory means of fighting the Fruit Fly, but up to the present no practical results have been obtained. Quite recently the effect of special internal parasites on some of the Trypetids (fruit flies) has been observed. As for instance in the case of *Hexamerocera brasiliensis* on *Ceratitis capitata*. For the present, however, only artificial means of fighting them need be taken into account. During the years 1903, 1905 and 1906 I had occasion to try, with excellent results, a method of combating the Olive Fly (*Dacus oleae* Rossi). This method, already tried in 1903, consists of sprinkling the leaves of the plant to be protected, beginning during the period when the fruit is liable to be spoiled by the fly, with a poisoned sugary solution.
>
> This solution is made up by taking of honey 31 per cent., molasses 65 per cent., glycerine 2 per cent., and arsenite of potash 2 per cent. The mixture can be stocked indefinitely, and when required for use must be dissolved at the rate of 10 parts of the mixture to 90 of water.
>
> It is well known that when the flies appear on the wing their eggs are undeveloped and require, in order to be brought to maturity and made ready for laying, a period of about 10 to 12 days, during which the flies must subsist on saccharine substances. Therefore, by placing within their reach the above mixture, for which they are very greedy, they are made to eat it and get poisoned before the eggs are laid. However, the poisonous substance, in order to be easily lapped up by the flies, must always be in a liquid state on the plants and, from observations I made, it remains in that state for a fortnight, after which the operation must be repeated and the mixture be again sprinkled on the trees. The same operation must also be repeated in case the mixture has been washed away by the rain.
>
> If the plantation of olive trees to be saved is situated at a distance of a few kilometres from other plantations which have not yet been treated, or if the treatment is general for a pretty extensive area, so that the possibility of a new invasion of the flies from the infested plantations can be prevented, there is no need of a second or a third treatment; if it is not so situated, in order to save the produce the treatment must be continued until the olives come to maturity. The quantity of solution to be sprinkled on each plant is about a half litre for each treatment (*i.e.*, about a pint.—Ed.)
>
> I have carried on the above experiments on 16,000 trees in three different localities, and have obtained absolute results, having succeeded in keeping sound, until they were ripe, all the olives on the trees which had been treated. This I did, although in the surrounding plantations all

> the olives were maggot-eaten and destroyed as early as September. Since the mixture is very soluble, the autumnal rains, which fall generally a little before the gathering of the fruit, are sufficient to wash off the poisoned substance, which was sprayed on to the olives. When, however, copious rains do not occur, it is necessary, before sending the olives to the press to wash them in water in order to prevent any risk of poisoning.
>
> Considering that *Rhagoletis cerasi* L. and *Ceratitis capitata* Wied. are similar in their habits to the *Dacus oleae* Rossi, I believe that it is possible to fight successfully against the said flies, as also against other *Tripedidae*, with the method employed by me in coping with the flies of the olive.
>
> I think it very desirable that, in regions devastated by cherry, fruit or any similar flies, a trial be given to this method which has given such good results against the olive fly, introducing such modifications as experience would prove necessary, and not forgetting to inspect the fruit before gathering, so that, in case it should be soiled by the mixture employed, it may be submitted to a careful washing before being offered for sale.

In the Western Province this method would likely be of much greater value than it would be in the Eastern Province. In the former the summers are dry and the mixture will not be washed off so quickly by the rains. In the Eastern Province, however, the winters are dry and the mixture may then be applied to citrus trees to destroy the winter adults.

The mixture given by Berlese would be much more expensive than the one recommended by the Eastern Province Entomologist, and it is not probable that its efficacy will be correspondingly greater. It is, however, desirable that this mixture should be given a trial, seeing the great success Berlese has had with it, while in this country the work was still in an experimental stage. It is singular that in two countries a parallel line of experiments, on such an important question, should have been carried on without either party apparently knowing anything of what the other was doing. Farmers who wish to try Berlese's mixture should do so with much caution at first, since the arsenite of potash is soluble, and might scorch the trees, especially as he recommends it to be used at the same strength as our arsenate of lead, which contains less than three-quarters as much arsenic, and that in an insoluble form.

The only objection to the adoption of the "poisoned bait" method would be the possibility of poisoning the bees; this question can only be settled by observation, and then only with difficulty.

Bees come to broken fruits very readily, particularly in the absence of flowers, and it has been observed in America that they get poisoned through feeding in spray-poisoned blossoms. But it remains to be determined if many would be attracted to small drops of poisoned, nearly or quite dry, sweet substance present on the foliage.

Anyway, this method deserves a thorough trial, as against the possibility of poisoning some bees we have the certainty of killing large numbers of fruit flies, since the latter eagerly lap up any sugary fluid which they come across. Parties who may experiment with either mixture are requested to report their results to the Government Entomologist

THE CHEESEMAKING INDUSTRY IN GRIQUALAND EAST.

BY R. SILVA JONES,
Government Dairy Expert.

A few years ago in the district of Griqualand East dairying was an industry confined to a very few who, conveniently situated to the excessively restricted local markets, were in a position to realise on their dairy produce at all, and even those had to be content with a small price in summer, and when the price rose in accordance with the short supply, few had any butter to sell. To-day things are quite different; nearly everybody now sees that the cheesemaking industry is sound, and those farmers who are living in the more remote portions of the district, can sell their milk readily; in fact, so readily that in almost every case the milk is sold on the spot. All the farmer has to do is to milk his cows, strain and see that the milk is handled in a cleanly manner, place it into the cans and stand in a shady place until such times as the milk cart calls for it, upon its daily round.

It is most essential that the milk for cheesemaking should be most carefully looked after. Even in East Griqualand a little more care could be shewn in some cases. Milk for cheesemaking requires even more cleanly handling than for buttermaking.

The best possible device should always be used in order to supply the purchaser of the milk with a thoroughly sound article, and with this object in view I would advise the following:—Firstly, that all receptacles with which the milk comes in contact should be most thoroughly cleaned, and the buckets standing in the kraal, receiving milk from the milkers, should have, at least, a single cover of flannel, and preferably a double one to act as a strainer and to keep the dust out. Kraal dung or dust in the milk has a most deleterious effect on the curd during the process of milking, and naturally on the resultant ripe cheese. The milk should be cooled to as low a temperature as conditions allow, and, above all, the milk must be thoroughly aerated. These two latter can be done at once by passing the milk over a Lawrence Refrigerator, which is fitted for cold water circulation inside the series of pipes, the milk flows over the outside which cools and aerates it at once, and the cooler the water used, the more thorough will be the aeration. Further than this, the milk calls for no other treatment to be in a fit condition for the cheesemaker. Of course, all milk from cows under medicine or sickness must be kept back, as must also milk from cows just calved. At least fourteen days should elapse after calving before the milk is sent to the cheese factory. The cans, of course, are covered from the sun during transit. In short, the main object of the milk supplies to the cheese factory should be to supply a milk as clean as possible and as sweet as possible. By sweet I mean a milk that has as little lactic acid already formed as possible. The cheesemaker can, under these conditions, have full control of the milk, and consequently a good saleable article is the result; and it must be remembered that nine suppliers may supply really good milk, but the tenth or indifferent one whose milk is not properly looked after, can easily reduce the value of the whole output, and consequently lower the market value, not only of cheese made from his milk, but from the milk of the whole vat into which the milk is mixed.

In East Griqualand the present system, with very few exceptions, is to milk once a day only, and that early in the morning; and so in most of the factories there, only the morning's milk is used, and where night's is used, the proportion of night's milk to morning's is very small indeed, and in the summer time the proportion could not be larger than it is, on account of the morning's milk often not arriving at the various factories until 10.30 to 11 a.m., at which time the milk, after travelling in the hot sun, is getting in a ripe state for cheesemaking, and therefore were the proportion of night's milk larger the maker would be unable to control the acidity in the milk. To be able to use night's milk, as would be a necessity, almost, in the Colony where the cows are regularly milked twice a day, one would have to be exceedingly careful and watchful of the conditions of the night's milk in the vat before the warm morning's milk was added; but still I think where there was a plentiful supply of good, cool water, the milk could be immediately passed over a Lawrence Refrigerator and run into the cheese vat, and then a stream of water allowed to pass through the double jacket of the vat all night, and thus keep it well cooled, that almost a half and half proportion of night and morning's milk could be made into cheese, provided that one could start rennetting directly the cows were milked in the morning, and not have to wait any length of time for milk to come in by carts. I do not think it could be done with such a large proportion of evening's milk except under particularly conducive circumstances, and that where the milk was well cared for. The price paid for milk in this district averages about 4d. per Imperial gallon, and the purchaser finds his own cans for collection and also the horses, carts and drivers to collect it, so that the producer really receives 4d. per Imperial gallon for his milk at his own door, and where, in ninety per cent. of the cases, the milk before cheesemaking started was almost valueless and useless It is estimated that during this season, about from the middle of November to the middle of May, the output of cheese will be about 170,000 pounds' weight, truly a very creditable output considering that the industry is so very young, and that the season for cheesemaking is comparatively short. The prices realised for the finished article vary a little, but one may strike an average, and say that the price realised is 8¾d. to 9d. per lb. delivered to purchaser. Now, considering that in theory a gallon of milk will produce one pound of ripe cheese—though in practice it hardly works out quite so much, but one can very safely estimate that 100 gallons of fresh milk will produce 95 lbs. of ripe cheese—there appears to be a considerable difference between the purchase price of a gallon of milk and the sale price of a pound of cheese. But the fact must be remembered that these factories are small, their output is also small, the farmers are very scattered to collect milk from, and expense of marketing is heavy on account of their isolated position. I think at present not one is doing more than 300 gallons per day, and the majority only half that and under. Now the expense of making a thousand pound weight per day is in reality no more than making one hundred weight per day, save for the corresponding extra proportion of rennett, colouring, and salt, and therefore the larger the output the greater will be the proportionate decrease in cost of manufacture per pound, and in this district, any way, its only means of securing a higher price for milk lies in greater production of milk and heavier supply to the cheesemakers, whose expenses for every pound of cheese sold after the plant is laid down, will proportionately become less as the supply of fresh milk becomes greater. With regard to the quality of the cheese turned out, speaking generally of all the factories, it is very good indeed. Some factories, of course, shew slightly better than others, but on the whole it is most creditable. In so far as the buildings are concerned, where the cheese is made, and rooms for ripening, here there is considerable difference. The best of those that I had the pleasure of seeing was the factory of Messrs. Lello and Gaby—who really are the pioneers of the cheese industry, also those of Mr. Gunther, Kokstad, and Mr. James Cole, Llewellyn. The others are, as a rule, carried on in makeshift places more or less suitable for the work, but many of these have schemes in hand for building suitable buildings to take the place of the present ones.

The district of East Griqualand has certainly made a name for itself for its cheese, and from letters that were shewn to me I gathered that there was no posible chance of glutting the market, as one firm alone had offers from three different merchants for their whole season's output, which in itself shews the healthy condition of the industry, and I am fully convinced that if the makers continue to maintain their good quality and keep up a regular supply and gain the confidence of the merchants, they have a great future before them. Owing to the district's geographical position, practically the whole of the cheese, except that for local consumption, is sold in Natal.

Now if such can be done in this district, why cannot industries of a similar nature arise in the remoter parts of this Colony, or even in those parts of the Colony that are not so remote, especially at this time of the year, when butter is fetching practically nothing at present, many hundreds of pounds lately going for 6d. per lb. and less? Our Agricultural Department is at the present time only too ready, and indeed anxious, to help and foster any such industries springing up, and I myself as Dairy Expert to the Department would only be too pleased to give any advice or come and teach anyone the process on their own farms. The pros. and cons. of cheese over butter in the "summer time" should be thoroughly studied, the chief of them are as follows:—

(1) One hundred gallons of milk will make, say, 95 lbs. ripe cheese, the same amount of milk will make, say, 35 to 40 lbs. butter. Cheese will realise, say, 9d. per lb., and the price of butter can be averaged out at the price obtained during the season in which it is proposed to make cheese.

(2) The summer heat is no detriment to cheesemaking, as in buttermaking; in fact, the heat is required for the process of cheesemaking.

(3) The expensive and cumbersome transport of butter to market twice or thrice a week is done away with; cheese is easily transported, and can be sent away as required in larger lots by waggon.

(4) The residue—whey—from the cheesemaking is an excellent pig food. Mixed with a little solid food they will thrive excellently.

(5) The initial expense of a cheese plant is a little heavier than one for buttermaking, but the plant is such that will last a life time with care, there being no wearing parts.

(6) Cheesemaking, on a co-operative system, say surrounding farmers selling their milk to a centre, relieves the farmer and his household of all the drudgery of buttermaking in the hot weather, and at the same time cheese is turned out in sufficient quantity from the collected milks to claim the notice of the merchants, a regular supply could be kept up, and by such means the imported article will be ousted from its position as is to-day the position in Natal through the introduction of East Griqualand cheese.

obtained from inland and coast produce dealers, they had decided to ship direct. To do this they had to engage a European agent, and for this purpose they appointed the firm of W. H. Muller & Co., a Dutch concern, with branches in England, Holland and Germany, and with whom they entered into a ten years' contract.

Ex-General De Wet said they were willing to take in any other Associations, or on the other hand the Unie was prepared to join any association if they thought it would serve the general purpose. All they wanted was one association for the whole of South Africa. He thought it was a shame that during the last two hundred years the people of South Africa had not come together before. Continuing, he said the middlemen were the curse of South Africa. Knowingly or unknowingly, they were killing a certain section of the population by refusing to discriminate between good clips and bad clips. Farmers were not encouraged to improve their clips because they received the same price for carelessly got-up wools as when they spent time and care in preparing their clips carefully.

Mr. Lyell also spoke, saying South African wool had a bad name on the European market, because their product was tampered with after it left the farmers' hands. To do away with this trouble and to ensure that their wool should not be tampered with, they decided to ship direct, so that no one should touch it until it was placed on the European market. Mr. Lyell then explained the terms of the contract between the Unie and Muller & Co., saying that although a member of the Unie was bound to hand all his produce over to the Unie for disposal through the firm of Muller & Co., he could resign from the Unie whenever he liked. They would thus see that a member was not bound hand and foot to the Unie for ten years. He said the result of their first shipment had been very satisfactory, as they had obtained 1d. to 1½d. per lb. more than they had ever done before. He did not consider the competition at Port Elizabeth was as keen and healthy as it was on the real markets in Europe.

In reply to Mr. Michau, Mr. Steyl, chairman of the Unie, said Muller & Co.'s offer was the most reasonable the Unie received, being 2 per cent. commission.

Mr. W. H. Hockly said there was no doubt that dissatisfaction existed amongst the farmers with regard to the prices they received for their produce, but he thought the step was too serious to enter into without full consideration, and no delegate would like to approve of the resolution without a mandate being given to that effect by their constituents. He advised that they should go back to their branches, and place before them the arguments and proposals so ably advanced by the Orangia Unie delegates.

Mr. Hockly then moved: That in the opinion of this meeting the proposal to amalgamate with the Orange River Colony Unie is one that cannot be summarily decided; that before entertaining any such proposal it should first be submitted to all the branches, and that delegates should come armed with the resolutions of their respective branches.

Mr. Oscar Evans seconded.

Mr. Hannon pointed out that the Cape Association should consider well before throwing over their present organisation to join the Unie. No definite scheme had been advanced as to the terms on which they proposed to amalgamate, and there were several other important matters upon which they should come to some understanding before the National Association took such a serious step.

Mr. Lyell said the Nationalist Association ought to take some definite action now, as they had been invited down on that understanding, but

Mr. Hockly pointed out that the suggestion had only been thrown out by the Cradock branch, and he regretted that this branch had taken upon itself to extend such an invitation to the Unie on behalf of the whole Association.

Mr. Lyell explained that they had received invitations from other associations in the Cape Colony, and had addressed meetings where they had been very sympathetically received. They already had branches in the Cape.

Mr. Hobson said he was in agreement with what the Unie delegates had said, and they in the Cape might yet be compelled to take the course the Unie was at present taking. They wished, however, to give the produce merchants at the ports a chance to do them justice. If the dealers did this, there would be no need to remove the wool trade from its present channels.

Mr. Coetzee withdrew his original motion, and Mr. Hockly's amendment was put to the meeting, and carried unanimously.

In proposing a vote of thanks to the Unie delegates for attending, Mr. Arnold spoke strongly against their action in forming Unie branches in the Cape Colony, as this tended to prevent the National Association from attaining its objects. He hoped the Unie would help them by confining its attentions to its own Colony.

THE HIGHLANDS SALE.

The next important matter was the report of the Highlands Wool Growers' Association on the public sale of the Association's wool at Port Elizabeth.

The report was read by Mr. Turberville, the secretary of the Highlands Association, as follows:—The Highlands Wool Growers' Association begs to report as follows upon their first annual sale of wool held in Port Elizabeth on December 7th last: Some 400 bales were submitted for sale on the public market without reserve, each individual member's clip being sold on its merits and through the owner's agents. All the bales were exhibited and opened, the wool being exposed to enable buyers to see at once what each bale contained. Previous to the commencement of the sale some members of the Association thoroughly examined the different clips, and considered that with the exception of one or two, the wool was all well and thoroughly sorted, skirted and rolled. Mr. Guthrie, president of the Port Elizabeth Agricultural Society, made a short speech before the sale opened, complimenting the Association upon their efforts to raise the tone of wool sales in the Colony, and hoped that they would be appreciated and responded to by the buyers. The bidding, however, was not at all brisk, and the hopes of the association were not realized. Prices ruled from 9d. to 11¼d., and considering the efforts made by members to place their wool on the market in the best possible manner by heavy skirting and rolling, they could not feel that they were being compensated for their trouble. Buyers seemed to base their values more on yield than quality and staple. This is not encouraging to wool growers who are trying to improve the quality of their wool by introducing valuable rams from other countries. It would appear from the prices obtained that brokers had little call for highest quality wools, those clips shewing any degree of fatty yolk were more or less neglected, even if of highest quality. With regard to the rolling of the fleeces and general get-up of the different clips, the desirability of which was so much recommended by the wool expert, Mr. McKee, as being a *sine qua non* with the manufacturer, no apparent appreciation was shewn or any advance in price given by buyers in Port Elizabeth. The members of the Association, however, are not disheartened, and mean to redouble their efforts by all possible means in their power, and by using improved methods to obtain better prices in the future.

Mr. Turberville amplified this report on some points, shewing how the members did everything in their power to meet the suggestion of brokers and so make the sale a success, even to selling absolutely without reserve. Amongst other things, he pointed out one cause of discouragement to members, viz., that just before the sale one outside Highlands clip, only very roughly sorted, fetched 11d., and one lot sent down just after, as a trial, totally unsorted, dags and all being thrown in, fetched a higher price than the same member's best heavily sorted wool did at the sale.

Mr. Hoole (Albany) also expressed himself as very disappointed with the Highlands sale at Port Elizabeth, and the explanation, to his mind, was that the men who grow first class wool in this country did not receive due encouragement. He was not compensated for his extra work in sorting and grading. A week after the sale he sent a bale of wool shorn from the same sheep, but with all locks, pieces. and bellies thrown in, and the bale branded under a different brand, and that bale fetched ½d. per lb. more than his good, well sorted wool. He did not know how that was to be explained.

Mr. Daverin explained that the quality of the wool did not enter so much into buyers' calculations as the quantity of good, clean wool contained in the clip. It all depended how much good wool was left in the clip after washing. They should not, however, be disappointed if they thought their efforts were not appreciated at once. It might take time before buyers did appreciate the new condition of things.

Several members expressed the hope that the Associations would not be discouraged by this disappointment, but should continue their present efforts. If they did not succeed, then they would have to ship direct to European markets.

Mr. Hockly said they must expect to lose this 1d. per lb. at Port Elizabeth. The produce merchants there had to make a profit. They would be fools if they did not.

Mr. Daverin said the produce buyers were almost to a man representatives of manufacturers or buyers at Home, and it was not a fact that two commissions were charged—one at the coast and one in Europe.

THE NATIONAL BRAND.

It was stated that the Association's national brand was already in use, it having been seen on bales at Port Elizabeth containing very inferior wool. This was looked upon as a very serious matter, and it was decided to take proceedings against such persons using the brand, as it was entirely unauthorised.

ELECTION OF OFFICERS.

The election of officers was then proceeded with.

The following members were elected to the Executive Committee: Messrs. W. H. Hockly, J. Arnold, P. J. de Wet, P. S. Heyns, Colin White, E. R. Hobson, P. J. Badenhorst, P. W. Michau, John Daverin, R. Stark, Julius Jackson, F. Powrie, M.L.A.

Hon. P. W. Michau, M.L.C., was unanimously re-elected president, Mr. W. H. Hockly, vice-president, and Mr. E. R. Hobson, secretary and treasurer.

The customary votes of thanks terminated the meeting.—*E. P Herald.*

SOUTH AFRICAN WOOLS.

THEIR PRODUCTION, PREPARATION AND SALE.

The following paper, by Mr. A. E. Murrell, a Port Elizabeth wool expert, was read at the last meeting of the Zwart Ruggens Farmers' Association, held at Graaff Reinet on the 17th ult.:—

It is hardly necessary, said Mr. Murrell, to preface my remarks to-day by any lengthy statement with regard to the importance of the subject, as I am sure that all who take an interest in the permanent welfare of this country will agree that the solidity of its position depends chiefly on its pastoral industries. Of these, one of the most important is that of the production of wool. It is equally unnecessary to go into particulars with regard to the consumption of wool. Suffice it to say that it is an article of necessity for which there always is, and always must be, a world-wide demand. In this respect it differs from two other important items of our production—mohair and ostrich feathers, the former being more or less subject to the dictates of fashion, while the latter is an article of luxury.

Nor is it necessary to trouble you with the history of the Merino sheep; of the time when Spain held, and jealously guarded, a monopoly of the production of Merino wool; of the first importations into South Africa towards the end of the 18th century; of their non-success for a time, owing to the conditions which then existed in South Africa, and of the sale of a portion of the small flock to Captain MacArthur, of Sydney, New South Wales, which assisted in the creation of the huge numbers which now exist in that part of the world. These are matters of history, about which you can read at any time.

What you wish to hear about is, doubtless, the present-day production of South African wool and the position which it occupies in relation to the markets of the world

I will not take up your time with detailed statistics of the quantities produced during different years, but will simply refer, generally, to the fact that for several years past, until recently, there has been, owing to the war and drought, a gradual lessening in the production. The year of biggest exports was 1891, when the shipments amounted to 322,000 bales. In 1904 the total production only amounted to 201,000 bales, and in 1905 to 209,000 bales. I am not yet in possession of the exact quantities for 1906, but the figures, so far published, shew that the total production is again increasing When I tell you that we shipped 10,000 bales more in 1880 than we did 25 years later, in 1905, you will see to what an extent we have lost ground. The actual difference, as far as Merino wools are concerned, is even greater than that shewn in these figures, as the shipments of the last few years include a much larger proportion of coarse and coloured wool (the product of Persian and Bastard sheep), than was produced formerly. Our production of wool, as compared to the total quantity grown in the world, is almost four per cent. of the whole, so that we cannot complain at present of any limit to the extension of our field for operation. But, although the field before us is large, we have not got it to ourselves. It is not even a question of maintaining a good reputation. That, unfortunately, we do not possess, but there is an old proverb that "It's never too late to mend," and we shall certainly require to mend our ways pretty considerably if we hope, in this age of strong—as I might call it aggressive—competition, to work ourselves into the front rank of wool producers. There have lately been distinct signs of a more general desire on the part of farmers in this country to improve their clips, and it is to endeavour to assist in this movement for the better that, by the invitation of your secretary, I am here to-day. (Applause.)

Dealers and Producers.

Now I know very well that many farmers have an idea, which has, unfortunately, been fostered by some persons (both on this side and across the water) for their own selfish ends, that the wool dealers in this country, sellers as well as buyers (especially the latter), are working for interests which are antagonistic to those of the farmers. Such opinions are absolutely groundless. That the buyer of wool should study his own interests is only natural. But the same position exists with the farmer, and I hope to be able to prove to you to-day that there is a common platform on which both may meet, where the interests of the one party may be closely identified with those of the other. In such a case there are, firstly, two positions to consider, viz., the producer and consumer. At this point it may be as well to impress upon farmers that, in order to obtain the best possible result, he must produce what the consumer requires, and that the latter is not compelled to buy what the farmer offers him The grower of wool in South Africa must always bear in mind that he is only one, amongst others, competing for the sale of his produce in the world's markets; that growers in other countries are competing against him, and that the consumer will first absorb what suits him best, after which he may be induced by lower prices to turn his attention to the inferior article. You know that such a position exists with regard to everything which you buy for your own consumption. You take what is relatively cheapest and best. Why should there be any difference in the case of wool. (Hear, hear.)

Now, if it be conceded that the consumer of wool devotes all his energies to securing what is relatively cheapest and best, the next question is, what, under the circumstances, is

THE BEST CLASS OF WOOL TO GROW,

so that it may satisfy the requirements of the consumer and yet leave the best return to the producer. That is *the* problem, the satisfactory solution of which is absolutely vital to the interests of wool growers in South Africa. The problem itself is not difficult to solve. I, as a wool man, can only tell you the answer. The detailed working out must be done by yourselves. The answer to the question of the best class of wool to grow is a wool which will give the best cash result per sheep.

In this connection I must again emphasize the fact (I have done so for the last 20 years) that the consumer wants clean wool only. The waste matter is worth nothing to him, while it adds materially to the clean cost by the heavy charges in connection with the transport from South Africa to the Home markets. It is on the clean scoured basis that the consumer buys, and it is, therefore, on the clean scoured basis that the producer must sell The weight per fleece is of no interest to the consumer. He buys the wool, at so much per pound, on the clean basis, and it is a matter of perfect indifference to him if the fleeces average 3 lbs. or 12 lbs. each. To the grower, however, the weight per fleece is of the utmost importance, and all his energies should be devoted to the furtherance of this object. Farmers are generally very much alive on this point. Where they are usually in error is in not studying more closely the relative positions of their wool in the *greasy* and in the *clean scoured* states, because it does not necessarily follow that the heavier the fleece, the greater the proportion of clean wool. On the contrary, the opposite is generally the case. Grow heavy fleeces by all means, but grow them on the basis of the *clean* weight.

Having decided that the principal object of the farmer must be to grow, on the clean basis, as big a weight of wool per fleece as possible, let us proceed to the consideration of the most suitable class, a class which would satisfy the requirements of the consumer and yet fit in with the best interests of the producer.

In order to arrive at a satisfactory conclusion, we must ask ourselves:

WHAT IS THE MOST VALUABLE TYPE OF WOOL?

The answer is: A wool which combines the qualities of fineness, length, strength, lustre, density, elasticity and evenness. A clip which possesses all these points in the highest degree would represent the ideal from a buyer's point of view. Such an ideal, however, from the farmer's point of view, is very difficult of attainment, and why? Because the various points above mentioned cannot all be induced to harmonize the one with the other. For instance, much density and great length do not go together, while extra fineness is not in harmony with that big clean weight per fleece, which, as already pointed out, is absolutely necessary in the interests of the farmers. In both instances an advantage in connection with one point can only be gained by the sacrifice of another. Now the question is: What point shall the farmer sacrifice, so that, on the whole, he may gain? He must make no sacrifice in connection with his endeavour to secure the biggest possible yield per fleece on the clean basis. If, in order to obtain the latter, he is compelled to lose a point or two in fineness, he will find it to his advantage to do so. The same position exists with regard to length and density. In all of the instances above mentioned the farmer will find it to his advantage to work for a good average, rather than pursue to the extreme any special point in connection with the ideal. The difference in value between an extra fine wool and one of good average fineness, is not sufficient to compensate for the additional clean scoured weight which the latter possesses as compared with the former, and the same comparison exists between wools of extra length and no density and wools of good density possessing average length. Changes in this direction have already taken place recently, even in Australia and Tasmania. The super-fine, genuinely silky wools of the old days are now seldom seen. They fetched extreme prices per pound, but the yield of wool per sheep was comparatively small, and this class has had to give way to a type of wool more robust and less valuable per pound, but with a much better return per sheep on account of the increased size and weight of fleece.

But, you will say, the farmers of this country are, and have been for some time past, doing their best to increase the weight of their fleeces. That is so, but, as the result here has been very different to what has taken place in Australia, it must be presumed that the methods in use in this country have been at fault. In Australia they have packed more actual wool on the sheep's body, and have maintained the clean scoured yield, generally, at a high level. In this country the increased weight of the fleeces, which has been brought about, consists largely of excess of grease, and the clean scoured yield of Cape wools has, except in the case of individual clips here and there, decreased to a considerable extent. I do not wish to go into detail about the various breeds of sheep, or to recommend or oppose one class or another That is entirely a matter for the farmer to decide, as he knows the climatic influences at work in his part of the country, and the quality of his veld and feed, but I feel that it is necessary to say something in passing about the type which is known as

THE VERMONT.

It is said by many that the Vermont sheep is one which has been of much use in building up the massive and valuable fleeces now being grown in Australia. On the other hand, the wool dealer in South Africa usually describes this particular animal as "a curse to the country." I have been asked by farmers, not once, but hundreds of times, to reconcile these two positions. My reply is, that the Vermont may be *used* in Australia, but it is certainly *abused* in South Africa. Let me endeavour to explain my meaning by a little illustration. There is a drug called strychnine, which is a virulent poison, but which, in its proper combination with other items, is often prescribed, in infinitesimal quantities, by medical men, as a tonic. Used injudiciously, it kills, but the use of it in accordance with your requirements, may prove of great benefit. That is probably the case with the Vermont. It might be useful to put the necessary amount of nourishing yolk into a dry, hungry wool, which lacks this quality, but to mate such sheep with a flock which already possesses a sufficiency, or perhaps even a superabundance, of yolk is a policy of suicide. Yet this is a policy which is being carried out by a very large number of wool farmers in South Africa, and which is the principal cause of the very low yield capacity of the bulk of our clip.

I have said that, in my opinion, the desideratum, from the farmer's point of view, and his pocket, is the production of a fleece of good average quality, of good yield, giving as big a clean weight as it is possible to obtain. If you agree with this statement you will begin to speculate in your own minds as to which breed, or combination of breeds, answers to this description. It is of no use asking for reliable information on this point from a wool man. He can tell you what is the most valuable class of wool, but it would be absurd for him to instruct you how to produce it. He is the wool expert, you are the wool producers. Of whom, then, should you ask for the requisite information? Ask it from yourselves. On this point it would appear to me (you must forgive my ignorance if I am wrong) that farmers' associations do not justify as fully as they might their positions as instruments worked for the good of the country. Of course, I am not speaking from personal experience of their meetings, but merely of what I have read in the Press about meetings of this and other kindred societies throughout the country. Do you, for instance, keep a record of the number of sheep owned by the various members of this Association, together with the average weight of wool shorn per animal, and the price obtained? If not, then it is a matter of vital importance that you should do so, because it is by the circulation of such information, which must be true and reliable, that knowledge as to the most profitable type of sheep can be arrived at. The price per pound which a man gets for his wool is, by itself, no criterion of the suitability of his particular class of sheep for breeding purposes.

THE STUD BOOK.

You have recently started a Stud Book for the registration of the best sheep in the country, and which, I take it, is, in the future, to be the standard to which all sheep breeders will refer. I presume that it is intended to make this work as complete as possible, but I make bold to say that this will not be the case unless full details of the weights and values of the fleeces are given. In the instance of the most important animals, the clean scoured result of the fleeces could be ascertained, and I can imagine no more interesting and useful competition to the wool-growing world of South Africa than that of the principal breeders exhibiting their best sheep against one another on the basis of the all-round result per head.

But, you will say, we have our agricultural shows all over the country, at which we exhibit our wool and our sheep. These are judged by the best men obtainable, and as they make their awards so do we form our ideas. As I am a member of the Committee of the Port Elizabeth Agricultural Society, and have also acted on many occasions as a judge of wool and mohair, I must be held partly responsible for the methods which exist in connection with that society. I have lately come to the conclusion, however, and especially since I sat down to write this paper, that some alterations could, with advantage, be made in connection with the judging of wool. I must confess that, with regard to the bulk classes, that is, the 3,000 and 1,000 lbs. classes, I fail to see how the judges could act differently to what they do now, viz., discriminate on the points of fineness, lustre, length, strength and evenness, and make their awards accordingly. Unfortunately, although the judgments may be absolutely correct, it does not follow that the first prize wool will, in the greasy state, fetch the most money, nor that it is the most profitable class for the farmer to grow, and the latter is the all-important question upon which the farmer desires enlightenment. My own opinion is (and I put it forward for your consideration and discussion) that the principal competition should centre on the class for fleeces, and that the method of judging them should be changed. At present they are simply judged as so much—on the same basis as the bulk classes. That, I think, is wrong. They should be judged on the basis of actual value per fleece, and there should be separate classes for rams and ewes.

PREPARING WOOL FOR THE MARKET.

I have pointed out in the foregoing what I consider to be the right track for farmers to follow, in their own interests, with regard to the production of wool. Presuming that they have produced the right class, the next step will be the preparation of the clip for the market. This is a most important matter, and I have written about it for many years past. The Government Department of Agricultural Co-operation is now giving attention to the subject, and wool growers throughout the Cape Colony are to be congratulated on being able to have practical illustrations given them by the Government expert, Mr. McKee, whose advice on this point is worthy of every attention. Mr. McKee's method is certainly a very drastic one, but it will have to become the general rule if the Cape clip is to be brought to a level with the best productions of other countries. I was present at one of Mr. McKee's practical illustrations, and it struck me that the farmers were not inclined to take out so large a proportion as he recommended. Certainly to a man who has never yet made any attempt at sorting his clip, the method advocated must appear very severe. I do think that every farmer who has a fairly large superior clip of good yielding capacity will find it to his interest to sort his wool thoroughly, but it will not pay the majority of farmers in this country to make many sub-divisions of their wools *until they have bred them up to a more satisfactory standard than that which exists to-day.*

I will tell you where the danger lies in this connection. The majority of farmers in this country, owing to the abuse of the Vermont and other causes, produce wools of an excessively heavy and wasty type, and if too much stress be laid on the question of sorting, they will come to the conclusion that they will simply have to sort their wools in order to obtain a much higher price than they have been in the habit of getting. In this expectation they will be grievously disappointed, and the danger to the progress of the industry lies in the fact that such disappointment may crush their desires for advancement, and cause them to relapse again into their previous retrogressive method. But, whatsoever clip a farmer may produce, whether it be large or small, good, bad or indifferent, it is absolutely necessary that he should carefully separate all locks and dung lumps from the fleeces. The dung lumps will not pay transit expenses, and should be kept behind on the farm, while the locks, after being packed in separate bales, should be branded accordingly, and sent down with the rest of the clip. My own opinion is that it should be a criminal offence for a man to pack locks and dung lumps with his wool. It is surely doing no worse to mix water with milk, or ground acorns with coffee, yet these are crimes for which the law provides severe penalties. Quite apart from this point of view, however, it is to the interest of the farmer himself to sort out of his clip every possible ounce of superfluous matter, bearing in mind that the chief basis upon which the value of his clip is determined is the proportion of clean scoured wool which it contains. This matter was gone into very fully in a pamphlet entitled "Wool, and its preparation for Market," issued some time ago by Messrs. Mosenthal and Co., of Port Elizabeth, whose produce department I have the honour to manage, and I would like to impress the contents of that pamphlet on every wool grower in South Africa. The sorting out of belly wool is not so much an absolute necessity as is the case with regard to locks and dung lumps. The reason why it is advisable that the former should be packed separately is because it is usually shorter than the rest of the fleece and because such faults as seed and burrs are mostly found on the belly, if not confined to that part altogether.

THE SALE.

I have now dealt with the points of production and preparation for market. The next and last phase is that of the sale. It is the most important consideration of all, as it shews the result of the farmer's work, and proves conclusively if he is on the right track or not. The chief thing to be desired, and without it no general and pronounced forward movement can be maintained, is that each particular clip shall be sold on its own merits, so that every farmer who works for improvement shall receive his *quid pro quo*, while the obstinately retrogressive man shall meet with his Nemesis in the shape of poor competition and low prices. The system which is at present generally in vogue in South Africa is not in accordance with these principles, and leaves much to be desired. In fact, a complete reorganisation is absolutely necessary, and until the latter is brought about no general improvement in the production and preparation for the market can possibly take place

There are two methods generally used in this country by the farmer for the disposal of his produce. The one is by sale to a country buyer (usually a storekeeper) in the nearest town or village, and the other is by consignment to the larger markets at the seaports. The first named channel is, undoubtedly, a wrong one for obvious reasons. The country buyer is not usually an expert in wool, etc.; in 99 cases out of 100 he has not the knowledge necessary to enable him to discriminate (even if he wished to do so) with any degree of exactness between the value of one clip and another In the absence of this expert knowledge the storekeeper is forced to make his purchases more or less on the principle of average, trusting to the proportion of good clips to make up for the bad ones. It is just this principle which it is absolutely necessary should be avoided, because the would-be progressive farmer when he finds that he is not remunerated for his improvements, naturally relapses into the old barbaric practices.

In the markets at the Ports, viz., Port Elizabeth, East London, Cape Town and Durban, an entirely different position exists to that which obtains in the country towns. In the former are to be found representatives of all the most important manufacturers and dealers in the chief centres of consumption, and the full equivalent of Home values for each individual clip is always obtainable. The methods in vogue at the Ports are, however, by no means perfect, and need reorganizing in the interest of the wool trade generally.

PUBLIC SALES WANTED.

In Port Elizabeth and East London the bulk of the business is done by private contract, a method which has some advantages, but also many drawbacks. There is not enough publicity about this way of doing business, and after nearly 30 years of experience in both the buying and selling of produce in South Africa, I am honestly of the opinion that the best interests of farmers would be served by public sales held regularly throughout the season. If you ask me why I prefer public sales to sales by private contract, I will answer: First of all because of the educational influence of the former. Education is brought about chiefly by observation of facts and comparison, and, for this purpose, publicity is the chief necessity. Look at the influence of such publicity in all wool transactions in Australia. I firmly believe that the great strides which that country has made in the production of wool are due, principally, to the public sale of each individual clip on its own merits. The farmer naturally wants to know; he wants, in fact, to see for himself that his clip, in the production and preparation of which he has devoted all his energies and facilities, is not made use of as a lever to get rid of somebody else's wool, which, on account of want of attention by the grower, does not find favour in the eyes of the buyer. If he be a truly progressive man, he will require no favour from anybody. He will simply want the full market price for his wool on its own merits, to have a full report upon it, and to be informed of any points which are considered wanting in his clip.

There are other points, too, which, although more or less sentimental, have, nevertheless, considerable bearing on the practical side of the question. For instance, a public acknowledgment of excellence is extremely grateful to human nature, while public condemnation is the reverse. Public sales of wool, while they increase competition amongst buyers, also, by their very publicity, stimulate the progressive power to further efforts and practically shame the retrogressive individual into a forward movement. Publicity in selling will, in this country, as in Australia, do more than anything else to stimulate that spirit of healthy rivalry which is essential to the advancement of the industry and the general good of the country.

If it be conceded that sales by public auction are in the interests of farmers, the next question is: Where should they be held? In the country towns or at the Ports? Certainly at the Ports, and why? One reason is to minimise expenses (because all expenses in connection with the buying of wool fall, indirectly, on the farmer). There should be as few centres of distribution as possible, and those should be at the Ports, for there, as already mentioned, are gathered together the representatives of the chief manufacturers and dealers in the wool world. They buy the wool at the full equivalent of its clean value, and by forwarding direct to the centres of consumption, save the farmer all the intermediate expenses which he would incur if he shipped direct to any particular market in any part of Europe or America.

There is, however, one thing which is essential to the satisfactory carrying on of public sales, and that is a spirit of broad-mindedness amongst the farmers themselves. They must recognize the fact that there are bound to be irregularities in prices. It may appear to them, especially at first, as if buyers made unreasonable differences between one clip and another, the more so if their lot happens to fetch less than their neighbour's. They must remember that they are not experts in wool, that they do not know the buyer's clean scoured limit, or what special outlet he may have for a particular class of wool. They cannot be expected to judge of the yield as closely as the buyer. In fact, when they offer their wools for sale, they must be prepared to submit to the collective judgment of all of the buyers, and learn from the different prices, combined with their knowledge of the yield per head of their own stock, where they excel, or where they require improvement.

THE FIRST PUBLIC SALE.

On the 7th December last, a sale was held in Port Elizabeth of clips belonging to members of the Highlands Wool Growers' Association, the first public sale on these lines ever held in South Africa. I was sorry to learn from your secretary that opinions had been circulated amongst farmers to the effect that the sale was not a success. I have heard similar expressions myself, but they emanated from people who do not see the good points of anything that does not suit their own particular ends. With regard to my own actual knowledge of the results as they appealed to farmers' pockets, I can only say that the firm which I represent sold only three clips on that occasion, and that they received three letters from the owners, expressing full satisfaction at the prices obtained.

What are the facts in connection with that sale? There were 396 bales offered, consisting of 347 bales first quality, and 49 bales of skirtings. The wools were throughout of satisfactory quality, and were locked and skirted. Some of the lots might, with benefit to the owners, have had a little more attention paid to the skirting, but as a beginning the exhibit all round reflected great credit on all parties concerned. The prices realized were as follows:—

The 347 bales first quality ranged from 9¼d to 11¼d., an average of 9⅞d. per lb.

The 49 bales bellies and locks ran from 4d. to 7¼d., or an average of 6¼d. per lb.

The all-round average of everything, inclusive of bellies and locks, was nearly 9½d. per lb.

These figures were eminently satisfactory, and I know of several buyers who were unable to operate, because they considered the prices paid to be decidedly too high.

The unfortunate point in connection with that sale was that, previous to its being held, many of the farmers concerned had fixed their ideas of values too highly. Some small clips, which had come down early, had been sold out of hand at 10d. to 10½d., and we sold one clip at 11d. The latter, I may mention, was an exceptionally light wool. However, no sooner had the farmers belonging to the association heard of the price than they raised their ideas, and each man expected that his clip would fetch at least the top figure and probably more. Two small, very light clips did, on their own merits, fetch ¼d. more, viz., 11¼d., and the owners were all smiles. The bulk, however, on their own merits, realised less, and some of the growers were dissatisfied. I hope you will now grasp what I mean by saying that the cultivation of a spirit of broad-mindedness among farmers is essential to the selling of wools publicly on their own merits.

Well, gentlemen, I have come to the end of my paper. It has been written rather hurriedly, and I may have been somewhat diffuse in my arguments. I hope, however, that the matter has been interesting, and that it may give you some food for thought. I have, in this writing, considered no other points than the welfare of the farmers, and consequently, the good of the country.

ANTHRACNOSE IN CONSTANTIA.

By J. L. Watermeyer, Government Wine Farm.

This fungus disease, fully described by the Government Entomologist in the *Journal* of July, 1906, has, in January of this season and after heavy rain, followed by hot weather, made its appearance amongst the vines in a virulent form in the Constantia area.

The varieties most seriously affected are:—White French, Waltham Cross, Barbarossa, Flaming Tokay, and, on some estates, Hanepoot.

Other varieties affected amongst wine grapes are:—Cabernet Sauvignon, Hermitage (slightly), and Mataro (slightly).

The following table varieties which were swabbed, sprayed, or not treated, shew it in the following degrees on the Government Wine Farm:—

Raisin Blanc. Not treated. Very mild form.
Crystal. Not treated. Very mild form.
Rose Chasselas. Not treated. No infection.
Barbarossa. Swabbed. Very bad.
Flaming Tokay. Swabbed. Very bad.
Waltham Cross. Swabbed. Very bad.
Muscat Hambro. Swabbed. Medium form.
Black Hamburgh. Swabbed. Medium form.
Black Spanish. Swabbed. Medium form.

Black Alicante. Swabbed. Medium form.
Gros Maroc. Swabbed. Medium form.
Black Monukka. Swabbed. Medium form.
Madresfield Court. Swabbed. Medium form.
Lady Downe's Seedling. Swabbed. Medium form.
Golden Queen. Swabbed. Medium form.
Muscadel. Swabbed. Medium form
Hanepoot. Sprayed. Not infected.

Rose Chasselas, which received no treatment, and growing in the midst of infected vines, shews no trace of disease. Amongst the American varieties attacked are:—Rupestris Metallica, and some of the recently imported hybrids.

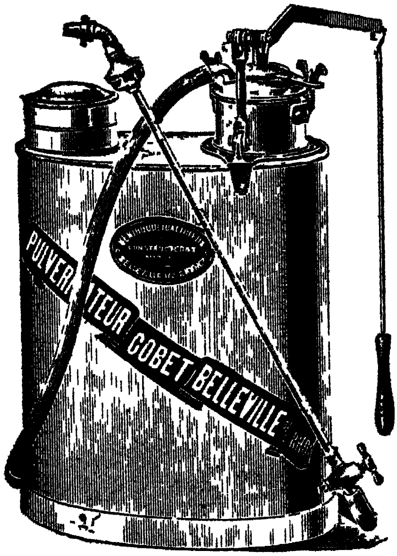
On another farm, heavy swabbing, and subsequent dusting with lime and sulphur has had no effect. The latter operation should have been done more frequently. One block of White French in the district is infected to such an extent that no crop will be obtained. In many cases, vines situated near trees or high hedges, sheltering them from S.E. winds, appear to be more severely attacked than others in the open. The methods of applying remedies on this estate were of a two-fold nature:—Swabbing, and spraying. One block of vines swabbed with sulphate of iron and acid solution, and treated to lime and sulphur dustings, also developed the disease. It is noticed from a recent publication on the diseases of the vine, that "In some instances dusting the vines with lime and sulphur, separately or both combined, seemed to check the disease, but then again it has utterly failed."

The second method employed was by the application of the sulphate of iron and acid solution with an Excelsior Gobet Sprayer. This proved most effectual, and no sign of disease is, up to the present, visible on the Hanepoot constituting the block of vines thus treated. Spraying, therefore, appears to be the more effectual treatment. This was also found to be the case in France.

A Californian authority writes of the value of spraying: "There may even yet be some sceptics who doubt the efficacy of spraying with fungicides for the purpose of combating, or, rather, preventing fungus diseases, but the experience of all who have used it early, carefully, and persistently, is wholly in its favour. The strongest proof of merit is its rapid and extensive spread since it was first made known to the public. At first there may have been as many as fifty persons who adopted and tried it, now the number is not less than fifty thousand."

It should be borne in mind that spraying with proved fungicides is preventive rather than remedial, and early applications are the most economical, as it requires less of the material to reach all parts of the vine when in a dormant state than when the foliage is fully grown.

The evidence in favour of spraying, as related above, should be sufficient inducement to wine growers to resort to that method, in preference to swabbing. The difficulty up to the present has been the want of suitable spray pumps. The Eureka Knapsack Sprayer with Vermorel Nozzle is largely used in America, but the Elcelsior Gobet Knapsack Sprayer was used on the Government Wine Farm.



The cut here represents this machine. It consists of a tinned copper tank arranged to strap on the back, the pump of which is worked by an iron rod attached to the lever, and when in position projects over the right shoulder.

The pump, contained inside the tank, is so constructed that all leakages from it falls back into the tank. As it is necessary, the pump is easily removable in order to keep the apparatus in good order The pump placed in the left of the tank, is kept firmly in position by means of a collar and clamps, fixed from outside A wire gauze strainer is fixed inside the filling cap to prevent the entrance of any solid substances. The air chamber gives an easy smooth motion, causing a steady, fine, misty-like spray to emanate from the nozzle. A ⅝-inch 4 feet long rubber tube connects the discharge from the tank with a metal tube possessing a stop cock, and measuring 15 inches. To this metal tube is affixed the Gobet Jet, consisting of a club-shaped piece of metal, being at its widest part ⅝-inch in diameter, and where three 1-16-inch wide and deep, spiral grooves are moulded, this piece of metal fits loosely into a contracting elbow joint attached to the metal tube, and over which a conical cap fixes by thread connection. In the extremity of the cap is the discharge aperture from which the jet is discharged. This nozzle being simply constructed is easily cleaned when clogged.

In order to keep the sprayer in good order the following instructions, which are sent with the apparatus, have to be complied with after using:—

(1) Remove the pump from the tank, place pump in a bucket of clean water, and work the piston by hand for the purpose of washing the cylinder.

(2) Unscrew the vent cap on the cone of the pump, pour clean water in, and rinse thoroughly. (Shake as when washing a bottle).

(3) Rinse the tank with clean water.

(4) Unscrew cap of jet, and wash in water, wash strainer near nozzle. Allow water to drain off, and when thoroughly dry, replace parts. It is asserted by taking this care, which is the work of a few minutes, the apparatus will work for years. Messrs. Robertson, of Plein Street, are, I believe, importing these machines for the coming season; also Woodhead, Plant & Co. The solution used is quickly destructive to unprotected iron, copper and brass, and hence ordinary spray pumps are unsuitable. The number of extra pumps ordered is likely to be very limited, so farmers who will want any should put in their orders early.

Objections are cited to the spraying of trellised vines owing to the subsequent corrosion of the wires; these are, however, not likely to rust through for some time, and the ultimate sacrifice of the wires will be counter balanced by the salvation of the crop, and vines. It may be mentioned that in Europe no regard is paid to the trellis, and annually heavy sprayings of copper solutions are meted to the vines, and rusty wires are seen everywhere.

TREATMENT.

Use the sulphate of iron and acid solution, and apply by means of spray pump, when vines are in the dormant stage, after pruning. When shoots are six to eight inches long, dust with lime and sulphur mixed in equal proportions, or spray with Bordeaux Mixture.

Four applications of the lime and sulphur dusting should prove effective under ordinary circumstances, but viticulturists must also take into consideration the conditions, whether damp or otherwise, of the situations of their vineyards also the particular climate existing in different localities. That of the Constantia area can be instanced, where the prevailing winds come directly from the sea laden with moisture. In such an area the application of lime and sulphur must be more frequent.

The disease can be detected in its early stages, and before the black spots appear. When the shoots are about six inches long, the Mycelium or spores of the fungus can be seen appearing like woolly white threads under the leaves, and a little later the minute black spots appear. When this is noticed, and no spraying has been done, curative treatment must immediately be commenced, which consists of cutting away any infected parts and burning them, dusting with lime and sulphur, or spraying with Bordeaux Mixture.

Infected cuttings, after pruning, should be destroyed by fire.

Viticulturists who possess varieties which are especially subject to attack, will have to, when the time comes, apply the remedies to check the pest. The seriousness of the question will be apparent when it is known that in one instance a farmer who was offered, and accepted, 4d. per lb. for his Barbarossa, lost his whole crop through neglecting to spray. This meant £150 less to his banking account, no mean sum in these times to a farmer. Many more cases can be mentioned.

No doubt now exists but that all varieties with but few exceptions, when not specially subject to attack, take the infection from sick vines in close proximity.

It is a matter of regret that no record exists of the names of the varieties which were imported by the early Huguenot Settlers, and which of these proved to be unsuitable, and probably the re-importation of varieties discarded by them are giving nowaday viticulturists the experience gained by the pioneers of the wine industry at the Cape.

It is a disease of long standing, and we note in Mr. Lounsbury's article on Anthracnose, that it existed sixty years ago at Stellenbosch.

FOR Best Garden and Farm Seeds. . .
FOR Orange and other Fruit Trees. .
FOR Roses and Shrubs. . .
FOR Hedge Plants. . .
FOR Palms. .
FOR Ferns . .
Etc.

C. STUBER.

FLORIST,
SEEDSMAN,
NURSERYMAN,
25, Castle Street, Cape Town.
Nursery: Rosebank, below Railway Station.

ALL ORDERS RECEIVE PROMPT ATTENTION.

SOUTH AFRICAN STUD BOOK.

ANNUAL MEETING CAPE STUD BREEDERS' ASSOCIATION.

The annual general meeting of the Cape Stud Breeders' Association was held at Cradock on Wednesday, January 23rd, when there was a good attendance, including Messrs. C. G. Lee, president, the Hon. P. W. Michau, M.L.C., vice-president, T. King, O. E. G. Evans, J. Rawbone, C. Southey, P. J. de Wet, J. Biggs, A. W. Douglass, H. A. Abrahamson, A. E. Pietersen, D. Abrahamson, J. D. Collett, G. Collett, Ewart J. Collett, D. Hockly, E. H. Gibbons, F. W. Baker, J. M. Bowker, F. D. MacDermott (Government representative), and J. Pike, secretary.

The Deputy Mayor of Cradock (Mr. M. J. du Plessis, M.L.A.), in the absence of the Mayor, extended a hearty welcome to the Association.

THE ANNUAL REPORT.

The annual report of the Registration Board was read as under:—

In presenting the first report to a general meeting of the members of the Cape Stud Breeder's Association, the Registration Board feels it would not be out of place to revert to a few details in the history of the movement.

The first Stud Book for South Africa is now an accomplished fact, and the labour involved in bringing that work to fruition is past and done with, but it would be as well to mention a few of the more salient features and place them on record as a guide for the future.

The beginning of the movement evolved at an Inter-Colonial meeting held in Bloemfontein on the 15th of December, 1903, when representatives were present from the Transvaal, Orange River Colony, Natal and the Cape. There the whole question was discussed, and a draft scheme formulated. which the various delegates undertook to place before the breeders and Governments with a view to enlisting active sympathy and support. In the Cape Colony, the Transvaal, and the Orange River Colony the movement received hearty and substantial support from breeders and Governments alike, but in Natal difficulties were encountered, and the movement there is still in the embryonic stage. For all that, strong hopes are entertained that all the States in British South Africa will be taking an active part in so important a work before long.

The first step taken in this Colony was the general meeting of farmers held in this town on the 19th of July, 1904, when the Cape Stud Breeders' Association was formed, with a membership of some eighty members.

A draft scheme was then adopted, Stock Committees formed for the various sections, the first Registration Board elected, and the general outline of the whole scheme agreed upon. At this meeting, delegates were elected to represent the Association at a general conference, held a few days later at Pretoria, under the auspices of the Agricultural Union. This conference was very successful, and among other important results adopted working schemes which resulted in the establishment of the Inter-Colonial Agricultural Union and the formation of the South African Stud Book Association upon a very firm basis.

At this stage the progress of the movement seemed assured so far as this Colony was concerned. The breeders had given their adherence and support. The Government of the day very graciously acceded to the representations made, and placed a substantial sum on the estimates to assist in the preliminaries, which sum was generously voted by Parliament, and the Stud Breeders' Association was launched under very favourable auspices.

But when it came to putting the scheme into effect, many unforseen difficulties and delays arose, which called for the greatest care and discrimination in handling. The whole movement was new to this country—and in fact is still new—and though it was received with enthusiasm by a majority, there were many who stood aloof and watched its progress with a certain amount of doubt. There were also bound to be differences of opinion among the members of the various sections, and these led to a good deal of discussion. These debatable points have now, however, been mostly settled, we are pleased to say, and with the publication of the Stud Book itself, the future looks bright and promising.

The first president elected, Mr. C. G. Lee, who was also honoured by being elected president of the governing body for the whole of the Colonies affiliated to the South African Stud Book Association, threw himself very heartily into the movement. For some months he undertook the duties of secretary and organising officer as well, travelling to various centres in the Colony, advocating the usefulness and value of the work, and by this means secured many adherents. For this the Stud Breeders' Association owes its president a deep debt of gratitude.

As the movement took more definite shape, however, it was felt to be necessary to appoint a permanent secretary, and at a meeting of the Central Council of the Stud Book Association held at Bloemfontein in January last, as the representatives of the other Colonies decided that the head office of that body should be at Cape Town, your Registration Board fell in with the suggestion and agreed to share an office with the Central Council, also the expenses of a permanent secretary to act for both. Applications were called for, and some fifty were received. From among them your present secretary, Mr. J. Pike, was selected, who has given every satisfaction since.

It is to be regretted that a general meeting of the members could not have been held earlier, but it was felt that with so many calls upon your time in attending to Stock Committees and other matters, it was scarcely worth while putting you to this inconvenience of attending merely to report progress. This was done as far as possible by circular, and the last elections for the Registration Board carried out in the same way.

We have now 196 members in this Colony, and have been receiving a large number of applications for entry of stock lately. A very large proportion of stock inspected cannot go directly into the Stud Book, many only being eligible for the Auxiliary Book, but there are several hundred notifications of progeny of registered stock, which will be eligible for entry in the next volume.

The total number of stock handled numbers some 3,580 head. The expenses incurred by owners for inspection work alone, during the last twelve months, amount to £271 3s. 6d., in addition to the amount appearing in the balance sheet. In future the cost of inspection will not be so heavy, the Cape Government Railways having kindly granted concessions, enabling members on inspection duty, or when attending meetings, to travel at half the ordinary fares.

The correspondence necessarily has been very great, as all applications for inspections are received at the head office, and the number of letters despatched during this year being over 1,800, not including 145 circulars, some of which were forwarded to each member of the Association.

The accompanying balance sheet, which is submitted for your information, speaks for itself.

It is your duty at this meeting to elect members for the Registration Board in place of the three now retiring, but who are eligible for re-election.

The financial statement shewed a balance in hand of £218, odd.

The President, in moving the adoption of the statement, said from the balance sheet it appeared that the Government was contributing more than the members, but as a matter of fact the members were contributing more, as the inspection fees were borne by the members, and did not appear in the balance sheet.

On the suggestion of Mr. J. Biggs, it was decided that a supplementary statement be added to the report setting out the amount which had been paid by members in registration fees.

The President, continuing, said: I welcome you to this gathering, which is your second meeting since you formed the Association two-and-a-half years ago, when you conferred the honour on me of electing me president of your Association, which responsibility was partially realized and accepted, only because I believed we had a membership willing to help, coupled with forbearance towards my shortcomings. My anticipations on this point have been realized, and the help has been real. Your co-operation with the other Colonies of South Africa has made it possible to issue the first volume of the Stud Book, which stands as a monument of real faithful co-operation quite regardless as to who are Cape, Orange River Colony, or Transvaal breeders. Further, it stands as another revelation, that in stock breeding, as in sport, there is much unselfish interest in the game, for its own sake; in other words, there is much interest felt in the achievement of others, in the work of improving our domesticated animals, to make them more profitable to the individual owner, to the country and for our descendants. You will observe that the Stud Book scheme represents, as it were, 22 different Stud Books, all worked from one head office, thereby giving the greatest posible return at the lowest possible cost, which might be termed "good business." The sections are not by any means perfect, but you have laid the foundation for each to continue with the work of improvement. All that has been accomplished, as far as the Cape is concerned, is mainly ascribable to the prompt, unflagging interest and hard work of your Registration Board, together with the unselfish work of your Stock Committees, and the highly appreciated helpfulness of the stock inspectors and experts, many of whom have had a work to perform which is new. While on this point, I would wish to mention the efforts of your secretary, with whom I am in almost daily communication. He had to jump into a kind of harness, which must of necessity be new to him, as it would be to any other, for the reason that no scheme of similar dimensions has been previously attempted in any part of the world, and he has done well. The working of the Stud Book reveals further that far greater interest exists in breeding good stock than could be imagined; the very fact of having 196 paid-up members for the Cape, at this stage, far surpasses all anticipations. The flock histories and records supplied by owners of many flocks prove conclusively that we possess stud flocks of great purity. That we have good stock is nothing new, but it is quite new to have an organisation, having for one of its objects the collecting and publishing of evidence respecting these things as is done by the Stud Book Association. Another point: there are outside the Stud Book good flocks and herds well worthy of a place therein, but the owners have not joined the Association. We can only hope that the day is not far distant when the Stud Book will have all the standard flocks and herds of the Cape, for we cannot afford to leave out one good animal or lose the advice and co-operation of one capable stock breeder. The foundation of your organization is laid, and the building can go forward, but only in conjunction with the other Colonies. It would be ungrateful to pass on without referring to the valuable help rendered by the Agricultural Department. The Department appointed Mr. F. D. MacDermott to act upon the Registration

Board, and his help has been most valuable. Further, we have a sympathetic Government confirming the promise of the last Government, who placed on the estimates the required sum, thereby securing the financial assistance needed. The financial position shews that you are becoming gradually self-supporting, and if I judge the intentions of members correctly, your aims are to eventually become practically self-supporting. This Association recognises the action of our Parliament in voting the estimates of the Government, and not only do we realize the valuable help vouchsafed by this Colony's Government and Legislature, but also are mindful of the assistance given to our work by the Governments of the other co-operating Colonies, by which it was made possible to issue the first volume of the Stud Book. There is one item which does not, of course, appear on your financial statement, and that is the amount paid by breeders for inspection, which amounts to £410; this comes out of members' pockets over and above subscriptions and registration fees, etc. Then, it will be remembered, our inspectors in most cases consist of breeders, whose time is most valuable; they leave their business and their homes to inspect stock practically for their actual out-of-pocket expenses. This is very encouraging. You will join in recognizing the help of Messrs. Mosenthal's Mr. L. Penny and Mr. Murrel, whose advice has been helpful, as well as that firm's kindness in granting free storage for ostrich feathers. My term of office, together with that of your vice-president (Mr. P. W. Michau) terminates. I hand over the responsibilities which I have borne for the last two-and-a-half years to anyone you may wish to elect, with the assurance that I will render all the help I can give you.

Mr. P. W. Michau could not let the opportunity pass without referring to the invaluable services rendered by the president (Mr. C. G. Lee). When the first meeting was held in Cradock two-and-a-half years ago, there were great difficulties to deal with, but they had been overcome largely owing to the splendid energy and capacity of Mr. Lee. No one could have done more for the Association than Mr. Lee had done. That fact should be placed on record.

ELECTION OF OFFICERS.

On the motion of Mr. Charles Southey, seconded by Mr. J. Rawbone, it was unanimously resolved that the retiring president and vice-president be re-elected. The mover paid a high tribute to the unflagging energy and ability shewn by Mr. Lee in organizing the Stud Breeders' Association.

Mr. Lee, in thanking the members for the honour, referred with regret to the fact that two Colonies have still to be included in the Stud Book organization, and expressed the hope that during the next twelve months their difficulties would be overcome, and they would be joining in the work, and thus be contributing to that larger work of federation—a united and federated agriculture throughout the whole of the British Colonies of South Africa. (Applause.)

Messrs. A. H. Frost (Tarkastad), Louis Gibson (East Griqualand) and A. Mulder (Oudtshoorn) were elected to fill the vacancies on the Registration Board.

A couple of questions of detail working were raised and discussed, and referred to the Stock Committees of the sections affected, when the usual votes of thanks terminated the proceedings.

SOUTH AFRICAN STUD BOOK ASSOCIATION.

The annual meeting of the Central Council of the South African Stud Book Association was held at Bloemfontein on Thursday, January 24th, when representatives from the Transvaal, Orange River Colony and the Cape were present. The work of the year was fully reviewed, and the financial position being considered satisfactory, it was decided to proceed with the production of the second volume of the Stud Book so as to publish before the end of the year. All applications for entry in the second volume must be in the hands of the secretary, Mr. J. Pike, Parker's Buildings, Cape Town, not later than June 30th. It was also decided to proceed with the printing and issuing of certificates as soon as possible.

THE PRICES OF MEAT.

Summary of Returns.

From 84 returns received from Magistrates, it appears that as regards —

COLONIAL MEAT.

Prices were *lower* on 1st December, 1906, than on 1st December, 1905, in	47 districts.
Prices were *higher* on 1st December, 1906, than on 1st December, 1905, in	9 districts.
Prices were *the same* on these dates in	28 districts.

FOREIGN MEAT.

On 1st December, 1905, it was sold in 16 out of 84 districts.
On 1st December, 1906, it was sold in 14 out of the 84 districts.

Prices were *lower* on 1st December, 1906, than on 1st December, 1905, in	5 districts.
Prices were *higher* on 1st December, 1906, than on 1st December, 1905, in	7 districts.
Prices have remained *stationary* in	2 districts.

PRICES OF COLONIAL AND FOREIGN MEAT, RESPECTIVELY.—1ST DECEMBER, 1905, AND 1ST DECEMBER, 1906.

Town or Village.	Colonial Meat.				Foreign Meat.			
	Beef.		Mutton.		Beef.		Mutton.	
	1st Dec., 1905.	1st Dec., 1906.	1st Dec., 1905.	1st Dec, 1906	1st Dec., 1905	1st Dec., 1906.	1st Dec., 1905.	1st Dec., 1906.
Aberdeen	4d to 8d	3d to 6¼d	5d to 6¾d	3¾d to 6d	..	..	..	..
Albany (Grahamstown)	8d to 10d	6d to 9d	8d to 10d	6d to 9d		..	.	..
Albert (Burghersdorp)	..	5d to 10d	6d to 8d	3d to 6½d	..	..	..	
Alexandria	6d to 9d	4d to 8d	4d to 9d	8d		..	..	..

Aliwal North	9d	5½d to 7d	7d	5½d to 8d	..	..	..	..
Barkly East	8d to 9d	8d to 9d	7d to 8d	7d to 8d		..	..	..
Barkly West	4d to 1s	4d to 1s	9d	8d	..	..	..	..
Bathurst (Port Alfred)	2d to 10½d	2½d to 10d	5½d to 9½d	6d to 8½d	..	.		..
Beaufort West	4d to 1s	4d to 1s	7d to 7½d	6d to 7d	..	..	..	..
Bedford	7d to 8d	6d to 7d	7d to 8d	6d to 7d	..	..		
Bredasdorp	6d to 8d	6d to 8d	6d to 8d	6d to 8d	..	..	..	..
Britstown	9d	9d	7d	6d	..	..	..	..
Caledon	7d to 10d	7d to 10d	8d to 9d	7d to 10d	7d to 10d	7d to 10d	..	..
Calvinia	7d	5d	7d	5d	..	..	..	..
Cape Town	6d to 1s	4d to 1s	6d to 10d	4d to 7d	4d to 1s	4d to 1s	4d to 7d	4d to 8d
Carnarvon	7d to 8d	7d to 8d	7d	6d	.	..	..	..
Cathcart	3½d to 7½d	3d to 7d	3½d to 7½d	3d to 7d	..	..	..	..
Ceres	6d to 9d	6d to 9d	7½d to 8d	6d	6d to 8d	..	6½d to 7d	..
Clanwilliam	8d	8d	8d	7d	..	..	..	..
Colesberg	3d to 10d	3d to 10d	5d to 8d	5d to 8d	..	..	..	..
Cradock	3d to 10d	3d to 10d	5d to 8d	5d to 8d	..	..	..	..
East London	4d to 7d	8d to 9d	3d to 7d	5d to 8d	5d to 6d	6d to 7d	5d to 6d	6d to 7d
Fort Beaufort..	6d to 9d	6d to 8d	6d to 9d	6d to 8d	..	..	..	..

THE PRICES OF MEAT—*continued.*

Town or Village.	Colonial Meat.				Foreign Meat.			
	Beef.		Mutton.		Beef		Mutton.	
	1st Dec., 1905.	1st Dec., 1906	1st Dec., 1905.	1st Dec. 1906.	1st Dec., 1905.	1st Dec., 1906	1st Dec., 1905	1st Dec., 1906.
Fraserburg	6d	6d	6d	6d	..	..	..	..
George	3d to 6d	3d to 7d	6d to 9d	5d to 8d	..		..	..
Gordonia (Upington)	6d to 7d	7d to 8d	6d to 8d	7d	..	..	..	..
Graaff-Reinet	5d to 8d	3½d to 6d	3d to 7d	4d to 6d	..	..	..	..
Hanover	..	..	5d to 6d	5d to 6d	.	..	..	..
Hay (Griqualand)	9d	7½d	7d	6d	..	..	..	..
Herbert (Douglas)	..	..	6d to 9d	6d to 9d		..	..	..
Herschel	9d	9d	9d	9d	..	..	..	..
Hopetown	9d	9d	9d	7d	..	..	..	
Humansdorp	9d	9d	9d	9d	..	..	..	..
Jansenville	6d to 9d	6d to 9d	7d to 8d	5d to 6d	.	..	..	..
Kenhardt	5½d	6d	6d	6d	..	..	..	..
Kimberley	9d to 10d	8d to 10d	7d to 8d	6d to 8d	9d	9d to 10d	7d	7d to 8d

King William's Town	4d to 14d	4d to 12d	7d to 10d	7d to 10d	6d to 9d	6d to 9d	6d to 9d	6d to 9d
Knysna	7d to 9d	7d to 9d	9d to 10d	9d to 10d	..	..	..	..
Komgha	4d to 11d	8d to 10½d	8d to 10½d	8d to 10½d	..	..	..	..
Kuruman	9d to 12d	9d to 12d	9d	9d	..	..	..	..
Ladismith	7d to 9d	7d	8d to 9d	7d to 9d	..	..	..	..
Laingsburg	7d to 8d	7d to 8d	6d to 8d	6d	..	..	..	..
Mafeking	6d to 11d	4d to 10d	8d to 11d	7d to 10d	..	..	..	..
Malmesbury	8d	7d	8d	7d	7d	6d	7	6d
Middelburg	6d to 8d	6d to 8d	5d to 7d	5d to 7d	5d to 9d	6d to 10½d	5d to 9d	6d to 9d
Molteno	6d to 9d	6d to 9d	6½d to 8d	6½d to 8d	..	..	..	..
Montagu	..	..	7d	7d	..	..	..	..
Mossel Bay	7d to 9d	8d to 9d	8d	9d	7d to 9d	7d to 9d	7d to 8d	8d
Murraysburg	5½d to 8½d	5½d to 8½d	6d to 7d	6d to 7d	..	..	..	..
Namaqualand (Springbok) ..	8d	7d	7d	6d	..	..	..	..
Oudtshoorn	11d	8d to 9d	11d	8d to 9d	..	..	..	..
Paarl	7d to 10d	9d	9d	7d	6d	6d to 8d	6d	7d
Peddie	5d to 11d	7d to 10d	8d to 9d	6d to 8d	..	..	..	..
Philipstown	8d	6½d	8d	6½d	..	..	..	..
Piquetberg	7½d	6d to 7½d	7½d	6d to 7½d	..	..	..	..

THE PRICES OF MEAT—*continued.*

Town or Village.	Colonial Meat.				Foreign Meat			
	Beef.		Mutton.		Beef.		Mutton.	
	1st Dec , 1905.	1st Dec., 1906.	1st Dec., 1905.	1st Dec , 1906.	1st Dec., 1905.	1st Dec., 1906.	1st Dec., 1905.	1st Dec., 1906.
Port Elizabeth	7d to 10d	6d to 14d	7d to 10d	6¼d to 10d	6d to 9d	5d to 10d	7d to 9d	5d to 7d
Prieska	6d to 8d	6d to 8d	6d to 7d	6d to 7d	..	..	..	..
Prince Albert	7d to 9d	7d to 9d	7d to 8d	6d to 7d	..	..	..	..
Queenstown	6d	6d	7d	7d	..	..	..	..
Richmond	7d	5d	7d	5d	..	..	..	..
Riversdale	8d	6d	8d	6d	..	..	.	..
Robertson	9d	8d	7d	6d	.	..	..	..
Simon's Town..	9d to 12d	6d to 13d	8d to 12d	5d to 11d	10d to 12d	10d to 13d	6d to 12d	6d to 8½d
Somerset East	6d to 10d	6d to 10d	6d to 10d	6d to 10d	..	..	..	..
Stellenbosch	6d to 11d	5d to 10d	8d to 9d	7d to 8d	5d to 10d	4d to 10d	7d to 8d	7d
Steytlerville	4d to 8d	4d to 8d	5d to 8d	5d to 8d	.	..	..	..
Steynsburg	4d to 6d	6d	4d to 5½d	5d to 6d	..	..	..	..
Stockenstrom (Seymour)	4d to 12d	4d to 10d	7d to 10d	7d to 9d	..	..	..	..

Stutterheim	3d to 7d	3d to 7d	5d to 7d	5d to 7d	..	..	..	..
Sutherland	7d	7	5d	6d	..	..	..	..
Swellendam	5d to 7d	5d to 7d	7d	6d	..	..	..	..
Tarka		6d	7d	7d	..	..	.	..
Tulbagh	6d to 7d	7d to 8d	5d to 6d	5d to 6d	6d to 7d	6d to 7d	5d	..
Uitenhage	5d to 10d	5d to 10d	5d to 10d	5d to 10d	8d	..	8d	..
Uniondale	8d	6d to 8d	8d	7d to 8d	..	..	..	..
Van Rhynsdorp	6d	6d	6d to 8d	6d to 8d	..	..	..	..
Victoria East	5d to 9d	4d to 8d	7d to 8d	6d to 7d	..	..	..	..
Victoria West	8d	8d	5d to 7d	4½d to 7d	..	..	..	..
Vryburg	7d to 10d	7d to 10d	6d to 10d	6d to 10d	..	..	..	..
Willowmore	7d to 9d	7d to 9d	7d	7d	..	..	..	..
Wodehouse (Dordrecht)	5d to 9d	6d to 9d	5d to 8d	4½d to 9d	..	..	..	..
Worcester	9d	8d	8d	6d to 7d	8d	5½d to 8d	7d	5d to 7d
Kokstad	8d	8d	8d	8d	..	..	..	..
Umtata	5d to 18½d	6d to 10d	5d to 13½d	6d to 10d	..	..	..	..

OVER-SEA PLANT IMPORT REGULATIONS.

The attention of the public who may wish at any time to import plants of any kind is drawn to the revised over-sea plant import regulations published as Proclamation 502, 1906, on December 25th. By mutual arrangement, the Orange River Colony, Transvaal, Natal, and Rhodesia have published, or are about to publish, similar regulations. The new Cape schedule is in most respects identical with the one which it supersedes, but certain modifications have been made with the view of securing greater efficiency, and also uniformity with the regulations of the other colonies. The full text of Clauses I. to IV., those which it is most essential should be understood by parties who may wish to order plants from abroad, are here reproduced in full and explained. Parties who are familiar with the old regulations should note that only certain specified kinds of fruit tree stocks may now be imported, and that a special permit is required to introduce any kind of fruit bearing plant.

I. No person shall introduce any tree, plant, or portion thereof, such as cuttings, roots, tubers, bulbs, seeds or fruit otherwise than by post or through one of the following seaports, namely, Beira, Lourenco Marques, Durban, East London, Port Elizabeth, Mossel Bay and Cape Town, save by special authority from the Secretary for Agriculture.

Articles for the Cape Colony landed at one of the ports outside the Colony will be dealt with at that port or at some intermediate point. It is some advantage to have consignments affected landed at Cape Town, as if any irregularity has occurred, the matter can there be adjusted with the least delay owing to this port being the headquarters of the Chief Inspector, to whom all questions which cannot be settled by the local inspector must be referred. For the same reason, it is preferred that parcels affected be addressed "*via* Cape Town for inspection"; but the inspection of parcels by post has also been arranged for at Port Elizabeth, East London, King William's Town and Kimberley.

II. No person shall introduce:—

(*a*) Any eucalyptus, acacia, or coniferous plant, or any living portion thereof, with the exception of seed

(*b*) Any stone fruit tree or any living portion thereof which was grown in any part of North America in which either of the diseases known as Peach Yellows or Peach Rosette exists.

(*c*) Any grapes in their fresh state.

(*d*) Any live peach stones.

(*e*) Any stocks whatever with the exception of:—

Pear.
Plum.
Apricot.
Cherry.
Mango.
Persimmon.
Apple accepted by the Secretary for Agriculture as being resistant to the attack of Woolly Aphis (*Schizoneura lanigera*).

(*f*) Timber with the bark on, except scaffolding poles shipped from Baltic Sea or from Canada, and except piles of the turpentine tree (*Syncarpia laurifolia*).

The term "stocks" in this clause shall mean young rooted plants intended for budding or grafting purposes.

The prohibition on Eucalyptus, Acacia and Coniferous plants is for the protection of the extensive plantings of trees of these kinds in South Africa. It is a popular fallacy that eucalyptus trees are not troubled with insects. Old Blue Gum plantations in New Zealand are said to be now dying out owing to the attack of a scale insect accidentally introduced from Australia. "Eucalyptus" means any species of the extensive genus of that name. "Acacia" likewise refers to every plant of the genus *Acacia*, in which genus is included the Australian blackwood and the various wattles. "Coniferous plant" means any species of the family *Coniferae*, that is the Pine family, which comprises the pines, spruces, larches, junipers, cedars, cypresses, arbor-vitaes, and araucarias, and also the less well-known *Ginkgo*, *Callitris* and *Retinospora*. The common Norfolk Island Pine is a kind of araucaria.

Stone fruit trees are held to include any and all plants of the genus *Prunus*, including plums, cherries, peaches, apricots and almonds, whether grown for fruit or ornament.

The fruit tree stocks listed are still admitted because of the claim that a prohibition on their introduction would be an unbearable hardship on some nurserymen. The writer hopes that the day is not far distant when their prohibition will be deemed practicable for their introduction is attended with considerable risk of bringing in pests. The older the plants are, the more the risk, for instance, a dangerous scale insect (*Aspidiotus ostraeformis*) is sometimes found with two-year-old stocks from France, whilst it has not been seen on yearling stocks. All stocks are fumigated on arrival with hydrocyanic acid gas, but there is danger of many troubles that would not be affected by the fumigation, and which cannot be detected at the time of importation however careful the inspection.

III. The introduction of the following plants, or of any living portion thereof, except seed and fruit, shall be limited to importations made by the Government under such precautionary measures as it may deem necessary:—

(*a*) Grape vines or other plants of the family *Vitaceae*.
(*b*) Sugar cane.
(*c*) Plants cultivated for the production of rubber.

The family *Vitaceae* includes the ornamental species of *Vitis* and *Ampelopsis*. With the exception of oidium, anthracnose, erinose, and phylloxera, the Cape is thought to be still free from the notable pests of the vine in Europe and America. The inclusion of sugar cane and rubber plants in this clause is chiefly for the protection of the other colonies.

> IV. Any tree or fruit-bearing plant or scion or other portion thereof for propagation, not prohibited or restricted by Clauses II. or III., may be introduced; but any such importation except of fruit tree stocks shall be allowed only under special permit from the Secretary for Agriculture. Such a permit shall be issued at the discretion of the Secretary for Agriculture, and it shall limit the introduction to not more than ten trees or 100 cuttings of any one variety, and such permits shall not be issued for more than an aggregate of 100 trees or 1,000 cuttings to any one person during one year. For the purpose of this clause, the term "tree" shall include any plant of the nature of a tree. In case of dispute as to whether any plant falls under the restriction, the decision of the Secretary for Agriculture shall be final.

This clause requires careful reading to get the full import. It restricts the introduction of all fruit-bearing plants, and of all kinds of *trees* to the limited numbers mentioned, and requires that special permission be obtained to introduce even a limited number. To avoid any chance of a misunderstanding, it may be well to specify that currant and gooseberry bushes, strawberry runners, blackberry and raspberry plants, pineapple and banana suckers, and also nut-bearing shrubs, such as the filbert, are included in the term "fruit-bearing plants." The term "tree" is interpreted liberally, or otherwise according to the risk thought to attend on the introduction of the kind of plant concerned; but though distinctions are drawn somewhat arbitrarily in certain cases, consistency is rigorously maintained by means of a compiled reference list of decisions, a copy of which is lodged with each inspector. Parties who are in doubt whether or not kinds of plants which they wish to import will be admitted or not are advised to communicate with the Government Entomologist, Department of Agriculture, Cape Town, before venturing to order. Amongst the plants admitted, and concerning which there is no need to enquire, are bulbs of all kinds, tender florists' plants, such as pelargoniums, cannas, fuchsias, chrysanthemums and carnations, greenhouse palms, ferns, azaleas, camellias, gardenias, syringas (lilacs), pittosporums, privets, rhododendrons, and all kinds of roses. Amongst the plants that require a permit are all kinds of *Cydonia, Crataegus, Prunus, Laurus, Ilex* (holly), *Magnolia, Catalpa*, maple, beech, birch, and poplar.

An applicant for a permit must state:—

(*a*) The full name of the kind and variety of each sort it is desired to introduce, and the number of each.

(*b*) The name and address of the nursery or party who is to supply the plants.

(*c*) Where the plants are to be set out, and whether or not it is intended to propagate them.

(*d*) The reasons thought to justify a special permit.

Permits are not given for the introduction of plants which would be sold at auction, nor for kinds readily procurable in the country, or easily raised from seed; and in the case of fruit trees and fruit-bearing plants, applications are likely to meet with refusal unless the parties are nurserymen or skilled fruit growers, professional or amateur, who require the varieties for testing and propagation.

Those who may wish to introduce plants from over-sea into one of the other South African colonies are advised to take the precaution of consulting the plant import regulations of that colony. Although the schedules for the several colonies are in most respects identical in their restrictions and prohibitions (or will be when those for the Transvaal and Orange River Colonies are published) there are a few differences. Only the Cape Colony prohibits the introduction of over-sea grown grapes. Natal and Rhodesia, in addition to restrictions on the introduction of plants identical with those imposed by the Cape, require that special permission be obtained for the introduction of flowering and ornamental plants of all sorts.

It seems unnecessary for present purposes to give the remaining clauses of the schedule. Their bearing may be given in a few sentences. It is ruled that anything introduced in violation of clauses I. to IV., above given, may be destroyed by the inspector. All plants and all parts thereof which are introduced, including fruit, are subject to a strict examination and to any treatment deemed necessary to cleanse them of any pest which may be found. The destruction of articles is provided for, should no treatment at command be considered effectual. All trees and woody plants (including roses) have to undergo fumigation as a precautionary measure. As a check on illegal introductions, unintentional or designed, the consignee is ordinarily called upon to furnish a list of the kinds of plants, and the number of each kind comprised in a consignment, and plants not declared in the list, or which are falsely entered, may be confiscated. No charge is made for the inspection, but all the expense of opening and closing cases, etc., of any treatment that may be prescribed, and of fumigation, is borne by the consignee; the charge for fumigation is according to a fixed scale. The Government accepts no responsibility for any loss or damage.

Consignees may secure, from the inspector at the port, forms on which to enter the particulars that are required, but the inspector will accept lists of plants on separate sheets if they are certified on behalf of the consignee to be correct; this admits of a list sent by the consignor being submitted. The generic and specific botanical names of the plants should be given, or else the commonly accepted English names; varietal names are unnecessary. Each plant, or bundle of plants, should be labelled or otherwise distinguished so as to assist in its identification. Much trouble is saved when plants are packed with a view to their being readily examined. If packed solidly in cases or bales, plants have to be removed for inspection and treatment; whilst if they are packed widely apart and with their tops free, both inspection and fumigation may be possible without their being removed. This suggestion applies particularly to ferns, palms, and florists' plants in general, including roses, and to plants introduced by Parcels Post alike with those than come as freight. A saving in postage may be effected by having plants wrapped in straw and moss, and then stitched up in canvas, but a parcel of this character must be opened up entirely for examination, and it cannot be made up again in as good order as at first. In such parcels plants should have their roots balled in moss independent of the outer wrappings.

In conclusion, it is strongly recommended that the public procure their plants as far as possible from nurserymen in the country, and leave to these nurserymen the task of importing the few they cannot supply. Plants propagated in South Africa are undoubtedly superior to those grown over-sea for planting here. Roses are amongst the chief importations; but there are a number of Cape nurserymen who are keen rose enthusiasts, and who lose no time in introducing and propagating the best new varieties.

C. P. L.

SOUTH AFRICAN INTER-COLONIAL PLANT IMPORT REGULATIONS.

ALSO PLANT CONVEYANCE REGULATIONS.

For some years past, Natal, the Transvaal, and Rhodesia have had import regulations affecting the introduction of plants, fruits, etc., sent up from the Cape Colony, the object being to check the dissemination of pests. The regulations heretofore have been far from uniform for the several colonies, and in consequence there has been great difficulty in getting consignees to understand and comply with them. Different forms of certificates were required to accompany certain articles by all three colonies, and plants freely admitted to one were debarred from the others. The situation was bad enough, but threatened to become worse through the Cape and Orange River Colonies proposing still other regulations to safeguard their interests. Action on the part of the Cape became necessary through an addition made to the Nurseries Inspection and Quarantine Bill by Parliament. But recognizing that unnecessarily complicated restrictions on inter-colonial traffic might tend to defeat rather than to advance the purposes in view, the Cape Department of Agriculture sought to secure a degree of uniformity in the regulations of the several colonies. As the outcome, practically identical regulations in regard to the articles concerned entering any one of the colonies from one of the others were agreed to, and are being adopted. The Cape schedule was published as Proclamation No. 501, 1906, on December 25th, and goes into force on February 1st. The Natal and Rhodesian schedules were published several months back, and those for the Transvaal and the Orange River Colony are likely to be out by the time these lines are read.

For the information and guidance of nurserymen, fruit shippers, and the general public, the Cape schedule is hereunder reproduced, and is supplemented with explanatory remarks on the various clauses and on the corresponding clauses in the schedules of the other colonies. Fruit shippers should note the remarks after clause V.

I. No person shall introduce:—

(*a*) Any cutting of any grape vine or any grape vine unless the same is resistant or grown upon roots resistant to the attack of grape phylloxera (*Phylloxera vastatrix*).

(*b*) Any apple stock or tree, unless grown upon Northern Spy roots or other roots which are accepted by the Secretary for Agriculture as being resistant to the attacks of Woolly Aphis (*Schizoneura lanigera*).

(*c*) Any tree or plant that was propagated beyond South Africa unless the introduction of the same into this Colony would have been permitted under Proclamation No. 502, dated 17th December, 1906.

(*d*) Any grapes that were not grown in South Africa.

The provisions *a* and *b* were wanted by all the other colonies. They have little importance as regards *imports* into the Cape Colony, but, as regulations of the other colonies, they concern our *exports*. Provision *c* alludes to the Over-Sea Plant Import Regulations. The several colonies have agreed to over-sea regulations, which are identical in most respects, yet which vary in some details. For instance, the introduction of grapes from over-sea into other colonies is not prohibited as it is at the Cape. Provision *d* makes it clear that such grapes may not be sent to the Cape after being introduced into one of the colonies where allowed, and occurs, of course, only in the Cape schedule.

II. No person shall introduce any nursery stock except under the following conditions:—

(*a*) That the nurseryman from whom the stock is obtained holds a permit from the Secretary for Agriculture for the introduction of such stock into this Colony. Such permit shall be granted if the Secretary for Agriculture is satisfied from the report of the Government Entomologist of the Colony in which such nurseryman's premises are situated, that no restrictions on the removal of the stock would be imposed were the premises situated in this Colony. Any such permit may be cancelled by the Secretary for Agriculture, and shall expire 12 months from the date of the inspection on which it is based.

(*b*) That any fruit tree, fruit bearing plant, and any portion thereof, other than fruit and seed, has been fumigated immediately prior to shipment with hydrocyanic acid gas in a chamber and by a method approved by the Government Entomologist of the Colony in which the nursery is situated.

(*c*) That every consignment be accompanied by a certificate in the form "A" appended to these regulations, specifying the number and kind of plants contained therein, and shewing that the provisions of Classes I. and II. of these regulations have been observed.

This clause lays down the conditions under which one colony will accept nursery stock grown in another. Any nurseryman in another colony who may wish the privilege of sending stock into the Cape Colony should notify the Government Entomologist of his colony. That official will thereupon transmit to the Government Entomologist of the Cape (who has the supervision of nursery inspection) a confidential report on the nursery in question, detailing what injurious insects and diseases occur on the premises. If from this report it should appear that the nursery is as clean as regards possible pests as would be insisted upon were the nursery situated in the Cape Colony, the desired permit will be issued. Similarly, any Cape nurseryman who wishes to send stock into one or another of the other colonies should give notice to this effect to the Cape Entomologist or to the inspector who examines his nursery, and thereupon confidential reports in regard to the nursery would be sent to the officials of the other colonies. Certificate forms for use in connection with *c* are issued to nurserymen who receive permits.

The next clause deals with plants *other* than nursery stock, and so concerns the general public.

> III. With the exception of:—
> (*a*) Vegetables or vegetable transplants,
> (*b*) Cut flowers,
> (*c*) Fruit,
> (*d*) Seeds,
> (*e*) Plants or portions of plants not to be grown,
> no person shall introduce any portion thereof which is not nursery stock, unless the following conditions are complied with:—
>
> (1) No consignments shall consist of more than 10 plants or cuttings of any one variety without special permission from the Secretary for Agriculture, which permission may be granted at his discretion.
>
> (2) That each consignment is accompanied by a certificate in the form "B" appended to these regulations, specifying the number and kind of plants contained therein, and shewing that the plants were not grown in a nursery, and, further, that the provisions of Clauses I. and III. of these regulations have been observed.

The design here is to control traffic between the colonies in plants from farms and private gardens. Plants from such sources may spread pests as well as plants from nurseries; and besides, if no control were exercised, there would be nothing to check the shipment of nursery stock as if from private gardens. The certificate forms necessary will be obtainable at the principal railway stations and post offices.

The corresponding clause in the schedules of the other colonies (published, or soon to be published, as stated above) contains a further provision. Plants for the Orange River Colony, sent under the "B" form of certificate, must go to Bloemfontein for inspection; for the Transvaal, to Johannesburg or Pretoria; for Natal, to Pietermaritzburg; and for Rhodesia, to Bulawayo, Salisbury, or Umtali. Therefore, consignments for any one of these colonies, whether by rail or post, should be addressed to pass in transit through one of the centres named in that colony. If the plants are officially examined and passed as clean before they are sent, and are so certificated, they are permitted to go direct to their destinations.

> IV. Any tree or plant or portion thereof, introduced in violation of the provisions of the foregoing clauses may be destroyed by order of the Secretary for Agriculture or any person authorised to act on his behalf.

This clause is inserted to make it clear that articles illegally introduced may be confiscated. A penalty for infringements is provided for in the body of the Proclamation.

V. All plants, or portions thereof, such as cuttings, roots, tubers, bulbs, fruit and seed, and all packages, cases, pots or other coverings of the same may, before being delivered to the consignee, be detained and examined by an inspector appointed for that purpose by the Secretary for Agriculture so as to determine, as far as possible, whether or not any injurious insect or plant disease is present, and it shall be the duty of the consignee or his agent to open the coverings and to afford every facility to the inspector during such examination. Such articles shall, when deemed necessary by the inspector as a precautionary measure against the introduction of any injurious insect or plant disease, be treated by or at the expense of the consignee in the manner prescribed by and to the satisfaction of the inspector, and if not so treated, or if such treatment be deemed ineffectual, the inspector shall destroy the consignment.

Each colony reserves the right to detain and inspect consignments of plants, fruits, etc., arriving from another colony, but it is expected that each will ordinarily allow consignments of nursery stock to pass undisturbed to the consignees. Cape grown fruit will be dealt with under this clause in the northern colonies and shippers are cautioned to sort out scaly oranges and lemons and codling moth infested apples and pears from any lots which they intend to send. Merchants, who may order fruit from the other colonies, as for instance, early citrous fruits from Natal, should warn those from whom they buy to send clean fruit only. It has been agreed to make a certain allowance for the practical impossibility that every infested fruit be detected in packing, so consignors need not fear in regard to lots which have been carefully sorted by trustworthy packers. A whole consignment will, of course, be judged by sample cases chosen at random. There is a chance that some bad lots may escape detection through the unavoidable absence of an inspector; and such an accident should never be taken to mean that it is safe to send more.

VI. The inspection and other treatment of consignments imposed by these regulations shall, save as herein excepted, take place on premises provided by the Government for the purpose, but special arrangements may be made with the Secretary for Agriculture for the execution of all the provisions of Clause V. on the premises of the consignee or other place when approved facilities are provided.

VII. Any article subject to examination under these regulations which is introduced into the Colony by post may be intercepted and examined by an inspector, and, if found infected with any injurious insect or plant disease, shall be destroyed or cleansed at the discretion of the inspector, and all expenses incurred under these regulations shall be paid by the addressee.

VIII. The Government does not hold itself responsible for any loss or damage that may result from the destruction of articles under the provisions of these regulations, or from any process or detention that may be considered necessary, to cleanse or disinfect the articles or to discover the existence or otherwise of any injurious insect or plant disease.

These clauses complete the schedule, and they do not seem to require explanation. The provisions all occur in the regulations of the other colonies.

PLANT CONVEYANCE REGULATIONS.

The Nurseries Inspection and Quarantine Act, 1905, requires that every plant nursery in the Cape Colony be registered, and be inspected from time to time by an officer of the Department of Agriculture. A prominent feature of the Act is the division of nurseries into two classes, "local nurseries" and "general nurseries," a premises being registered in one class or the other at the option of the nurseryman concerned. It is made illegal to despatch plants grown in a local nursery by rail or any other public carrier, or to distribute them by any means beyond the borders of the fiscal division within which the nursery is situated; but the local nurseryman is left to please himself as to whether or not he takes any steps to suppress injurious insects or plant diseases (not specially dangerous) which are pointed out to him by the inspector. The distribution of plants grown in general nurseries is not restricted as to place. But the Act prescribes that all plants standing within a certain distance of any found infested with proclaimed pests remain in the nursery "under quarantine" until at a subsequent inspection all are found clean; and a regulation under the Act now requires that certain kinds of plants be fumigated with hydrocyanic acid gas immediately prior to distribution.

To bring to notice any violations of the Act respecting the conveyance of nursery stock by rail, and to disclose any illegal introductions of plants from the other colonies, and also as a measure to assist in determining the importance of the private interchange of plants as a means of disseminating pests, the following regulation has been proclaimed, and will be put into force on February 1st. It is embodied in the schedule to Proclamation 503, 1905, the remaining clauses of which are not of sufficient general interest to justify their publication here; they have application to nurseries and nursery stock only.

No person shall offer or accept for conveyance by railroad any plants or portions of plants save as herein provided, unless the same is accompanied by a certificate in one or another of the forms specified:—

(*a*) A certificate in the form A or B appended to these regulations, shewing the consignment to be for a destination in the Orange River Colony, Natal, Transvaal or Rhodesia, or to have been forwarded from one of these colonies for Cape Colony.

(*b*) A certificate in the form C appended to these regulations, shewing that the consignment consists of nursery stock, and that the conditions of the Nurseries Inspection and Quarantine Act of 1905, and all regulations thereunder which apply to such stock have been observed.

(*c*) A certificate in the form D, shewing that the consignment does not include plants or portions thereof from any nursery in South Africa.

(*d*) A certificate signed by an Examining Officer under the over-sea plant import regulations promulgated by Proclamation No. 502 of 1906, or any Proclamation which may be hereafter issued in that behalf, shewing the consignment to have come from over-sea and to have been passed by him for delivery.

(e) A certificate signed by the Minister for Agriculture or someone acting in his behalf specially authorising the conveyance of the consignment.

The provisions of this clause shall not apply to vegetables, vegetable transplants, bulbs, tubers, cut flowers, seed and fruit, nor to fencing posts, firewood and other parts of plants not to be grown.

The officer in charge at the railway forwarding station shall see that the certificate required appears to be in order, and shall see that the same is forwarded securely attached to the consignment or to the invoice or way bill. The officer in charge at any railway destination in the Colony shall detach the certificate, or receive a duplicate of it from the consignee, sign the same, and mail it at or before the end of the current month to "Government Entomologist, Department of Agriculture, Cape Town."

The forms "A" and "B" are those mentioned in the discussion of the inter-colonial plant import regulations above. Nurserymen alone are concerned with "A" and "C" forms; and ordinarily the general public will have only to do with those styled "B" and "D," supplies of which will be kept at the chief railway stations for the convenience of consignors. Probably no better or safer way to keep a certificate with a consignment will be found than to make use of a "label-envelope," inscribing the shipping directions on the outside and enclosing the certificate within. Label-envelopes, which are closed with a metal fastener, are now used by some merchants for sending invoices with goods, and such are admirably adapted for the present purpose.

C. P. L.

WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION.

Record of Eggs laid from 18th June to 31st January, 1907.

Pen No.	Breed.	Pullet No.	1st to 31st Jan.		TOTAL PER PEN.	
			Eggs.	Points.	Eggs.	Points
1	Buff Orpingtons ..	1*				
		2	16	32		
		3	10	17		
		4	10	20	315	609
2	Partridge Wyandottes	5	4	7		
		6	13	20		
		7	10	19		
		8	6	9	286	481
3	White Wyandottes ..	9	13	26		
		10	10	20		
		11	16	32		
		12	13	21	464	883
4	White Leghorns ..	13*				
		14	19	25		
		15	14	28		
		16	24	40	541	912
5	White Wyandottes ..	17	12	24		
		18	8	15		
		19	11	22		
		20	21	26	396	712
6	Buff Orpingtons ..	21	7	14		
		22*				
		23	10	19		
		24	11	22	322	637
7	Plymouth Rocks ..	25	14	24		
		26	11	15		
		27	14	27		
		28	16	25	422	681
8	Buff Orpingtons ..	29	12	24		
		30	13	18		
		31	12	24		
		32	11	22	317	589
9	Brown Leghorns .	33	17	34		
		34*				
		35	10	20		
		36	14	25	372	715
10	Buff Orpingtons ..	37	12	24		
		38	10	20		
		39	15	28		
		40	10	18	373	712
11	White Leghorns ..	41	7	14		
		42*				
		43	16	30		
		44	11	22	362	711
12	Buff Leghorns ..	45*				
		46	21	42		
		47	1	2		
		48*			317	586

*Dead.

Western Province Agricultural Society's Egg Laying Competition—*continued.*

Pen No.	Breed.	Pullet No.	1st to 31st Jan.		Total per Pen	
			Eggs.	Points.	Eggs.	Points.
13	Buff Orpingtons ..	49*				
		50	9	18		
		51	11	22		
		52	15	29	373	719
14	Buff Orpingtons .	53	12	22		
		54	16	30		
		55	9	17		
		56	9	18	405	715
15	White Wyandottes .	57	12	15		
		58	11	22		
		59	10	20		
		60	1	1	285	470
16	Black Orpingtons ..	61	11	22		
		62	2	1		
		63	4	4		
		64	14	28	332	661
17	Buff Orpingtons ..	65	17	33		
		66	11	19		
		67	10			
		68	11	22	313	529
18	White Leghorns	69*				
		70	13	26		
		71	17	31		
		72*			412	790
19	Brown Leghorns .	73				
		74	20	40		
		75	19	31		
		76	19	38	432	750
20	White Leghorns ..	77	7	14		
		78	21	42		
		79*				
		80	1	5	336	649
21	White Leghorns ..	81	8	16		
		82				
		83				
		84	11	24	212	411
22	Buff Orpingtons	85	8	16		
		86	11	21		
		87	11	14		
		88	12	14	349	601
23	Buff Orpingtons ..	89	21	20		
		90	14	28		
		91	12	21		
		92			391	726
24	Plymouth Rocks .	93	12	16		
		94*				
		95	16	17		
		96	13	24	289	431

In scoring, 2 points are given for every egg weighing over 1¾ ounces, and 1 point for every egg weighing 1¾ ounces or less.

* Dead.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible.

All letters or contributions should be plainly addressed: "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication.

Citrus Failures.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—With reference to the valuable report of Mr. C. P. Lounsbury on above, I can bear out his remarks from practical experience. I have tried many grafted citrus trees, but they have been to me a costly failure, except those obtained at great expense from the Eastern Province. These trees must be grown in tins or similar vessels, those grown in the open ground being quite useless and a total waste of money owing to absence of hair roots.

As to the best kind of stock, Cape lemon is undoubtedly far away the best; not necessarily the rough Cape lemon, but the smooth, oval thin skinned variety, which does not get scale. Seville stocks (for Western Province, at any rate) are not to be compared to either kind of Cape Lemon. It stands to reason that a native tree—the Cape lemon is a native by this time, if not originally—is the best. The survival of the fittest is bound to follow in all cases, and Cape lemon is as much superior to any other "stock" for this country as the Cape almond is for stone fruit. Of course, most of the diseases are the result of planting citrus trees in unsuitable ground; they will only thrive in a well drained, sandy soil, and it is useless to try them in any other, though they will grow almost anywhere.

If a tree will not grow and keep healthy with the lower branches on the ground to protect both trunk and roots from the sun, you may be sure the soil is not suitable, and give it up.

As before stated, my experience has been considerable, and this season more fruit was obtained from one seedling tree than from 100 grafted trees, planted at the same time, grafted on Seville stocks grown in the open ground. While my grafted trees, grown in tins and obtained from the Eastern Province, are just as good as the seedlings, they cost twenty times as much owing to railway charges, but bear the second year.

Seedling trees are five years before coming into bearing, though when they do commence they fruit much more rapidly, grow larger, and are more vigorous. The first year of bearing they give as much as the grafted trees of the same age, and in a few years more than the grafted, owing to their superior size.

A few rules for beginners might be useful:—

Only plant in well drained, sandy soil, which can easily be irrigated (citrus trees will not grow without water), say, twice a week in summer. I have never seen the situation where they grew to perfection without water.

Buy only strong trees grafted on Cape lemon stocks, which have been grown entirely in tins.

Make the hole for planting, place the tin in the hole (after cutting out the bottom), then cut from top to bottom, and bend the tin open, and remove it without disturbing the roots; when finished and the hole is filled in, the roots of the tree should be a little above the surface of the ground; that is, don't bury the tin, but when placed in the excavation, it should be three inches above ground level. Water at once, and keep damp until rain or until fairly rooted.

Citrus trees should only be planted out when in a dormant stage (which occurs three or four times a year). If growing, wait until they stop; they won't hurt; but much damage will be done if shooting. Don't let the young trees carry much fruit for the first few years, for they will not grow, and will probably die altogether.

Citrus trees, unless planted in very rich soil, require plenty of manure laid in a saucer-shaped excavation round the stem, and then filled with water to settle it.

In a well drained soil, gum disease and root rot need not be feared.—Yours, etc.,

CITRUS GROWER.

Worcester, 5th February, 1907.

Very like Paspalum.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I am forwarding under same cover a grass which is growing wild on most of our farms. It grows chiefly along the water furrows. Now, I have found this same grass growing from and amongst some seed supplied to us as "Paspalum." The Paspalum is growing, but mixed with this grass. Another farmer told me that he had sown some Paspalum seed, and found that only a kind of *red* Paspalum (which I take to be this grass) grew. I shall be much obliged if you will kindly let me know whether this is really Paspalum grass of another kind, or whether it is seed which has by mistake got into the Paspalum seed. It does not appear to be of as good a quality as the real Paspalum grass. Can you let me know the nature of the grass? Is it like Paspalum of continual growth, or just from one to two years? This is important, as growing along the water-forrows it can easily get into the lucerne lands, and if not an annual will have to be eradicated.—Yours, etc.,

F. D. AINSLIE.

Rockwood, Bedford, January 24.

The specimen enclosed is not Paspalum, but is described by the curator of the Herbarium as *Panicum crus-galli*, L. It is known as the "Barnyard or Cockshin Grass," and is described as an annual. It does well along river banks and near stagnant water. It is just possible that it may have got mixed with the Paspalum seed sown by our correspondent, but as it is growing wild on some of the farms it is also just as likely that the seed may have been carried among the Paspalum by water or some other accidental cause. As Paspalum is perennial, and a very strong plant, it may be left to deal with the intruder itself. In other places, Paspalum, once established, leaves very little room for other plants to grow alongside it.

A Troublesome Weed—Sckuhria bonariensis.

To the Editor, AGRICULTURAL JOURNAL.

I am sending by this mail a specimen of a plant (for identification) which is growing on the railway embankment near Bedford. I first noticed it about two years ago. It has spread over the embankment, and has spread from there about 150 yards, and may be seen along the main road to Adelaide, which crosses the railway line at that spot. No stock seem to eat it, and it thrives most luxuriantly, even on bare places, and is destroying the grass wherever it grows. I should think it will have to be treated as a noxious weed, judging from the way it is spreading. I have not seen it anywhere else but in that locality.—Yours, etc.,

THOS. WM. KING,
Vice-President Bedford Farmers' Association.

Kingsvale, Bedford, January 28.

We can find out nothing as to the properties of this plant. The curator of the Herbarium has identified it as *Schkuhria bonariensis*, Hk. & Arn., a native of Chili. This plant was sent to the Herbarium last year, both by the Chief Inspector of Scab and the Director of Irrigation, who reported that it was spreading rapidly along the banks of the Orange River. At the time it was thought to be one of the numerous weeds introduced during the war. Since then, however, the species has been determined, and it has also been ascertained that it was collected by a Mr. Galpin in March, 1898 by the roadside, Bongolo Valley, near Queenstown. If it is spreading, as our correspondent describes, it would be as well to make some effort to bring it under control, as it is evidently not of much value.

Horse breeding in South Africa.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—A report of an interview appeared some time back in the columns of a contemporary, same having been held with Mr. Fynn, De Beers Consolidated Mines, Ltd., farm manager.

Mr. Fynn states that the dams of half-bred horses bred at De Beers farms were Army horses, same being those which remained in the country after the war. It would be interesting to know what percentage of these mares were fruitful, and to what particular class of horse, *viz.*, "Thoroughbred Stallion," "Cleveland Bay," "Hackney," or "Yorkshire Horse," these being the types of stallions stated by Mr. Fynn as being bred from. (The "Yorkshire Horse" I cannot locate.) [By "Yorkshire Horse" is evidently meant the Yorkshire Coach Horse.—Ed., *A.J.*]

What I should like to know is: Has the percentage of mares been profitably fruitful, and if so to what type of stallion? Has the progeny developed good bone and *riding shoulders*, and to what size do they grow up to four years old?

The question of placing good dams amongst farmers is the great point to be made in the horse breeding question in South Africa. If this were backed up by Government placing high class thoroughbred stallions with good bone at nominal fees before breeders, or granting premiums for suitable stallions, undoubtedly a good foundation would be laid of a good breed of horses. Too much stress cannot be placed on the question of good dams being introduced.

Personally I will at once state that no scheme of horse breeding that does not include the production of good dams can be of much use, and further, that the type of mare that finds her way into the Army ranks has not enough bone and scope about her for a brood mare. At least, I cannot help thinking that the mares left in this country after the war had hardly sufficient character about them to justify their being laid down as the foundation of a good breed of horses. I would suggest that if the Government take up the question of horse breeding in an intelligent manner that they would put 10,000 well selected two-year-old fillies amongst the farmers of the Colony, when *acclimatized*, they to have been imported from Ireland, England, New Zealand, and Australia (half-bred fillies. By this means, there is at once the foundation of a useful breed of horses introduced. The question of buying two-year-olds suggests itself on the point of getting the number of mares and at a price within reach. To attract buyers from Europe and elsewhere, the size, substance, and character of horses must be raised to make horse breeding commercially successful. Should Government move in the matter there is no necessity for the introduction of experts, as a few South Africans versed in the horse question could be sent Home to visit the best hunting centres, and take stock of the stamp of horses they there see. "The Beau ideal" of the general utility horse is without doubt the Irish Hunter, an animal always commanding a good price. Such a type of horse can be bred in South Africa at a very nominal cost, with the necessary foundation being provided. A point that strikes me at once when looking at South African mares and horses is the fact of their shoulders being what is described by judges as "*Thin shoulders*," *viz.*, "Thin through their shoulders." They lack the muscular oblique shoulders all well-balanced weight-carrying horses must have. This would no doubt be eradicated in time by the introduction of new blood, both dams and sires. It is to the practical judge a fatal point.

The question of breeding polo ponies is a very important feature, the stamp being a miniature weight-carrying hunter, standing with naked feet at four years old 14.2 hands. The regulation height of registered ponies at Hurlingham is 14.3 hands, five years old and upward. There is a constant and growing demand for polo ponies in America and Europe. The small South African mares mated with nice, short-legged thoroughbred stallions would, no doubt, breed polo ponies. The introduction of Hackney blood, some 15 years back, into Ireland I most strenuously opposed in the columns of your contemporary, the Irish *Sport*, and was backed up by all the principal judges and horse dealers in Ireland, but, unfortunately, the Government knew better than men who were practical judges, and Hackney stallions were introduced into the West of Ireland, and had to be abolished, they doing great harm, their products being useless. Of course, in a country like Ireland, where the aim of all breeders is the blood galloping horse, Hackney blood meant poison. The same, to my mind, applies to South Africa. The Dutch and all African farmers like good blood, as distance and staying powers mean everything. The whole question requires to be tackled in a practical manner by those who take an interest in the true welfare of agricultural South Africa.

My experience in Ireland for years has been that farmers invariably sold their good dams, the result being that at present a great shortage of good hunters exists. There is no reason why South African farmers should not produce a similar article.

Personally, the South African horse I look upon as a most useful animal for South African purposes, but for purposes of commerce to attract foreign buyers the animal is useless.—Yours, etc.,

W. H. HOVENDEN.

Mansion House, Kimberley, January 6th, 1907.

P.S.—The question of breeding mules and jennets must attract breeders. There is a large consumptive demand for these animals at Kimberley, and I understand the supply comes from New Orleans. I may add that the experience of the Transvaal Government has been that the Army mares purchased by them after the war were useless as brood mares.

The Maggot Fly.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—During the last few years large areas in the Albany District have been planted with rape, and while acknowledging the very beneficial results as a means of feeding stock during the winter months, its usefulness is greatly marred owing to the susceptibility to fly-blows sheep experience while grazing on it.

This pest is becoming a very serious one. In one instance I have known fifteen out of thirty stud sheep struck in a single day, and unless immediately attended to, very heavy loss occurs.

In a wet season like the present, flocks grazing on the veld are often attacked, and as it is impossible to inspect and examine all the sheep daily, heavy loss is occasioned.

Nearly every issue of the *Pastoralists' Review* (Australia) deals with this important subject, and numerous remedies are suggested.

No difficulty is found in destroying the maggot. What is required is a mixture that will prevent the fly striking the sheep.

Fly ova have been sent to Mr. Dewar, Government Entomologist, Grahamstown, and to Messrs. Morris Little and Co., Port Elizabeth. The latter have supplied me with a preparation, "Little's Fly Dip." This mixture has a most unpleasant odour, but destroys the maggot instantly, and has a very healing effect. In fact, more nearly approaches the requirements mentioned than anything I have yet used. I should like to have the experience of farmers whose sheep have been similarly affected.—Yours, etc.,

T. T. HOOLE.

Atherstone.

Blauwtong or Malarial Catarrhal Fever in Sheep.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—As "Tongziekte" has made its appearance amongst sheep, both on this and many other farms, and as many animals will probably succumb, just as they did in former years, we beg to ask you if there is perhaps a remedy to combat this fatal disease, which generally attacks and kills the fattest sheep, and we are at a loss what to do.—Yours, etc.,

P. J. & J. K. UYS, BROS.

Wankey, Heldelberg, C.C., January 17, 1907.

This disease is "Blue tongue," or Malarial Catarrhal Fever in Sheep, and has been fully dealt with from time to time in the pages of the *Agricultural Journal*. Copies of pamphlets have been forwarded for distribution. A vaccine for inoculation purposes is obtainable on application to the Veterinary Laboratory, Grahamstown.

Preserved Green Mealies.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Can any of your numerous readers please give me the American recipe for preserving the green mealie, called, I believe, "Succotash." It is imported into the Colony from America in tins, the mealies floating in a liquid. I am most anxious to preserve some in that way.—Yours, etc.,

R. H. PRESTON.

Exwell Park, Waku, January 8th.

The green mealie mentioned is put up, so far as we can learn, in much the same way as preserves, without the sugar. It is first cooked and then sterilized in the tins and sealed. But the mealie used is not the ordinary field mealie, but a variety specially grown in America, and known as "Sweet Corn." It has been cultivated in South Africa, and did well. The "Succotash" mentioned by our correspondent is, we are informed, a mixture of sweet corn and Lima beans, and is very popular in the United States.

Algerian Oats.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Could you, through the medium of your useful *Journal,* give me some information with respect to the difference between the two varieties of Algerian oats? I have sown two bags, and the crop leaves nothing to be desired, whereas my father's crop, also the result of two bags, was a failure. It was full of rust, and although it grew very well, the horses won't touch it, either as a green or a dry feed. A description of both varieties will be most useful and welcome to myself and others, as I would not like to propagate the objectionable variety.—Yours, etc.,

"LEERGRAAG."

The question, as to differences in the varieties of oats, was dealt with in the last issue of the *Agricultural Journal.* This, however, seems an entirely different case, and can only be explained on the presumption that the seed from which the crop failed was not Algerian oats at all, but some other variety sold under that name. It may possibly have been seed from Algerian sown for several generations in this country. In that case the failure is quite accountable, as the best of imported seed seldom stands longer than three generations.

Jackal Proof Fencing.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—On account of scarcity of labour I will be obliged to enclose my farm "jackal proof," and run my stock without shepherds. Now I would like, through your *Journal,* and also, if possible, direct, advice and all information from men with the required experience. Firstly, do you think it will answer in these parts with the large extent of country, and waters few and far apart? One cannot make the camps smaller, as the country is not good enough for small camps, and waters not about enough, to be able to cut into so many small camps. My idea is that these well-bred Merinos, especially ewes with lambs, will stay away too long from the water, and consequently either die or get very low in condition. Secondly, what kind of fence do you advise me to put up? Also cost of same? I have noticed that ant-bears burrow under existing fences, and creep through. Do you think that a barbed-wire low down, or fence packed with stones underneath will stop them from burrowing? And which do you think the better plan? There are many baboons here; how about keeping them out?—Yours, etc.,

FARMER.

Richmond, C.C.

A copy of the *Agricultural Journal,* No. 3, Vol. XXVII. (September, 1905), containing full information on the major points raised has been forwarded. The others must be largely decided by the man on the spot. Some of our readers, however, may be able to offer a little helpful advice.

Weights and Measures for Veterinary Medicines.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—It is sometimes a little difficult for farmers to act on the good advice given by the Department or in books on veterinary subjects. The difficulties I allude to arise:—

(a) From the irregularity of our British systems of weighing and measuring. This makes it a puzzle to ascertain which of these systems to use and a trouble to use them when ascertained.

(b) From the want sometimes of scales and weights, or of measures of capacity, some, even when obtained, getting out of order, broken or lost, and

(c) From uncertain measures, such as spoonfuls, being indicated.

I wish, under correction, to deal suggestively with these matters in the above order and to ask advice.

(a) Since one finds medicine prescribed, it is natural for a layman, a farmer, to suppose when a weight is mentioned that the system of Apothecaries' weight is indicated, but it appears from "Veterinary Notes for Horse Owners," by Capt. Hayes, F.R.C.V.S., page 594, firstly, that the *official* scale of weights for (horse) medicines is *Avoirdupois*. In this, 437½ grains are 1 oz., and 16 ozs., or 7,000 grains, are 1 lb. An ounce Avoirdupois (437½ grains) with one-tenth part thereof added thereto, is equal to 1 oz. Apothecaries' weight, which is 480 grs. Capt. Hayes maintained also that "For convenience sake and in deference to former custom, it is *usual to accept* 60 grains as equal to 1 drachm, and 8 drachms (480 grains) to 1 oz." This is *Apothecarics'* weight in which 12 ozs. go to the lb. of 5,760 grains. (It agrees with Troy weight so far as grains, ounces and pounds are concerned). Thus it appears that there is no definite *rule* as to whether the "official" scale or the scale which it is "usual to accept" is to be followed in administering medicines to animals. I see, by-the-bye, that photographic chemicals are "almost exclusively measured in Avoirdupois." How much better the simple and uniform French system is. I venture to suggest that it might, perhaps, be well to indicate to farmers definitely what weights and measures must be used and to mention exceptions, if any.

(b) Farmers have often only grocers' scales for Avoirdupois weight. Sometimes they are unaware that any other weights exist. When they do have a little box of scales and weights for use in domestic medicines, these weights are sometimes roughly made of cast metal, and the smaller ones roughly snipped from a thin sheet of brass. I have known the weights in different boxes to differ appreciably from each other. Besides this, they get lost. I have had occasion to puzzle out with some difficulty how a farmer far from town (or a veterinary surgeon, for the matter of that) can, at a pinch, arrive at accurate weights, both by the Apothecaries and Avoirdupois scales. One naturally refers to the precious metals and coinage for an accurate standard of weight. For instance, current gold must be of accurate weight within a small fraction of a grain. Referring to gold coinage, one finds that £3 10s. in gold coin weighs almost exactly 6 grains short of an ounce Avoirdupois, and is really 431.46065 grains, while the said ounce weighs 437½ grains. This is an accidental approximation, and is of considerable help. In the silver coinage, 66 shillings, or the equivalent of that in any silver coins as they come from the Mint, must weigh 1 lb *Troy*, 5,760 grains, which is the same as 1 lb. *Apothecaries' weight*. And it follows that 5s. 0d. in any new coins must weigh 1 oz. or 8 drachms or 480 grains, and that 2s. 9d. in any new coins must weight ½ oz. or 4 drachms or 240 grains. A crown piece, or any silver coins making up 5s., weighs only one grain and a small fraction less than an ounce Avoirdupois. It weighs 436.3636 grains instead of 437½. By weighing 2s. 9d. in such silver coin against fine sand, and dividing this by weight into two equal parts, one can obtain a weight of 2 drachms, and can then make a solid weight of that denomination in lead. By a similar process a single drachm weight can be obtained, and again a half-drachm and a quarter-drachm, or 15 grains. Then, at a pinch, a narrow oblong strip of paper of even breadth can be cut and weighed till it balances the 15 grains, and it can be cut into three equal oblong parts to give 5 grain weights, and by a similar process five slips, weighing 1 grain each, can be obtained. I once had occasion to do this, and it was quite satisfactory. But a farmer ought really always to possess very good scales and weights, and be able to render an accurate account to the Department of what he has done in any case of doctoring his animals. I have been dealing above with *Apothecaries'* weights as obtainable from silver coinage. Avoirdupois weights can be similarly obtained from *pennies* in bronze coinage. Forty-eight new bronze pennies weigh 1 lb. Avoirdupois, 24 pennies ½ lb. Avoirdupois, 12 pennies ¼ lb., and *3 pennies weigh 1 oz. Avoirdupois, i.e.,* 437½ grains. A bronze penny weighs one-third of an ounce Avoirdupois, *i.e.,* 145.8333 grains. A half-penny does not quite weigh half the weight of a penny *i.e.*, 1-6th of an ounce. It weighs 87½ grains, or one-fifth of an ounce, and a farthing weighs 43¾ grains, or 1-10th of an ounce. Two bronze half pennies and one bronze farthing weigh together half an ounce Avoirdupois. Three pennies and one farthing weigh 481¼ grains, or just 1¼ grains more than 1 oz. Apothecaries' weight, while three pennies and a silver sixpence approximate yet closer to that weight. They give about 481 1-10 grains. The bronze coinage is not so accurate as to weight as silver or gold coins, but bronze coins are quite sufficiently accurate for our practical purposes, and more so than any but the best weights, and will thus be useful for farmers.

(c) Since weighing is so easy it does seem as if it would be better in many cases to drop the *measuring* of powders by spoonfuls. Spoons differ so much in capacity, and besides people's notions of measuring with spoons differ considerably, and this becomes serious when such medicines as arsenic and sulphate of copper are prescribed. If these are to be administered at all by measure it seems that it would be better to use a glass measure on which 'drachms" etc., are marked—and with the powder slightly shaken down. But weighing is the safest, and Dr. Hutcheon did well when, in his article on the 'Treatment for Worms in Domestic Animals," he fixed an "average tea-spoonful of Cooper's Dip Powder" to be, for the purpose of his prescription, 135 grains. This article was printed in the number of the *Agricultural Journal* for November, 1905, and reprinted in Pamphlet 21, 1905. He consequently gives 1,080 grains to be added to one gallon of water (160 ounces) for 160 lambs under three months old. It appears evident that such a method of prescribing would be advisable in all prescriptions for dosing animals wholesale, a system which will have to be regularly practised to enable us to attain to what should be our ultimate object, namely, the clearing our whole flocks and herds and the country thoroughly of all internal parasites, as we hope to do with all external parasite . Yours, etc.,

Joseph M. Orpen.

P.S.—One quarter of an ounce Avoirdupois contains 109⅜ grains, while a bronze half-penny and a three-penny piece weigh almost the same, *i.e.*, 109 1-3 grains. A three-penny piece weighs nearly exactly 21 8 10ths grains.

Suspected Tubercle in a Cow.

To the Editor, Agricultural Journal.

Sir,—I have a young cow which cast a three months' calf. In taking away the after-birth, I felt the womb covered with small, hardish things about the size of peas. For some time past she has been in an unhealthy condition. She feeds fairly well, but does not get fat. In fact, she seems to be getting poorer. Can you tell me what to do with her? Our veld is very good, and I have been giving her bran as well, but still she does not get fat.

When she cast her calf I syringed her womb with some stuff I got from the chemist, and I am certain all the after-birth came away. - Yours, etc.,

David Masson.

Vryburg, 3rd February, 1907.

If the womb was thoroughly washed out, and there is no unhealthy discharge from it, I am suspicious that she may be affected with tuberculosis of the womb. Has she a cough?—D.H.

RURAL REPORTS.

Albert.—Weather very changeable, with splendid rains. Veld in very good condition. Vines doing fairly well. Cattles and horses in satisfactory condition.

Aliwal North.—Warm weather with heavy rains. Veld looking splendid. Fruit, crops and stock all doing well.

Barkly West—Heavy rains have fallen and the veld is looking very well. Vines and fruit trees scarce. Stock fairly satisfactory.

Bathurst.—Weather very changeable with very heavy rains and the veld is in splendid condition. Several farmers have gone in for Lucerne growing and have been most successful. Wheat and mealie crops most promising. Stock generally doing very well.

Ceres.—The weather has been warm with heavy rainfall. Veld in splendid condition. Fruit trees doing well. Crops fairly satisfactory. Stock generally in good condition.

Douglas.—Good rains have fallen and the veld is in splendid condition. Fruit and mealies doing well. Stock generally in good condition.

East London.—Plenty of rain has fallen and the veld is looking very well. Coast locusts are about but have done little damage as yet. The few vines which are in this district are in promising condition. Fruit trees in good condition. Wheat practically a failure. Oats, mealies and Kafir Corn doing fairly well and Lucerne doing very well. Cattle and horses in fair condition, goats and pigs doing very well.

Fort Beaufort.—Weather moist and very close with heavy rainfall, and veld in splendid condition. Vines suffering somewhat from Rust. Fruit trees coming on well. Oats somewhat damaged by the heavy rains. Stock generally in good condition.

Griquatown.—Heavy rains have fallen and the veld is in excellent condition. Crops and stock doing fairly well.

King William's Town.—Good rains have been experienced and the veld is looking very well. Fruit trees coming on fairly well,—vines scarce. Very little grain, but what there is is in fair condition. Stock generally doing fairly well.

Ladismith.—Rainfall light with warm weather. Veld in good condition. Fruit somewhat damaged by worms. Vines and crops in promising condition. Stock doing well.

Malmesbury.—Very nice weather has been experienced with average rains, but the veld is looking rather dry. The oat crop is rather bad, but wheat fairly good. Stock generally in fairly good condition.

Middelburg.—Average rains have occurred, but the veld is not in very good condition. Grain and lucerne doing well. Stock generally doing well.

Mossel Bay.—Heavy rains have fallen and the veld is in good condition. Fruit trees doing fairly well. Cereals promising. Stock generally in fairly good condition.

Namaqualand.—Weather changeable, and veld, except in a few places, is looking well. Stock in fairly good condition.

Oudtshoorn.—Weather very mild and veld in excellent condition. The rainfall has been heavy. Crops and fruit trees promising. Stock doing well.

Peddie.—Weather warm and mild and veld in very good condition. Splendid rainfall. Crops promising and stock doing well.

Philipstown.—Weather intensely hot with heavy rainfall, and veld in splendid condition. Fruit trees promising, and stock doing well.

Prieska.—Weather very hot, but fairly good rains have fallen, and the veld is looking well. Stock generally doing well.

Robertson.—Very heavy rains have fallen and the veld is in splendid condition. Fruit trees and lucerne promising. Some of the wheat has been a bit damaged by the heavy rain. Stock generally doing fairly well.

Steynsburg.—The weather has been warm with fairly good rainfall. Fruit trees, crops and stock doing well.

Sutherland.—Light rains and veld dry. Pears and apples in fair condition. Cereals not very promising. Stock not doing very well.

Upington.—Very warm weather with good rains and the veld is looking well. Vines, fruit trees, cereals and stock all doing well.

THE TRANSKEI.

Cofimvaba.—Thunderstorms with heavy rains were frequent, the rainfall being 5·49 inches—considerable damage by hail was done to standing crops in the upper portion of the district, but generally the crops look well and have come on rapidly since the advent of warmer weather and the prospects of a good harvest are still bright. Three outbreaks of Redwater have been reported, and the usual steps taken to isolate the affected stock, otherwise all stock is in very good condition and the pasturage is abundant.

Mount Ayliff.—Heavy rains have fallen and the veld is in good condition. The vines would have been better without so much rain. Fruit trees and cereals promising. Stock doing well.

Mount Frere.—There have been heavy and continuous rains during the month. Mealie and Kafir Corn crops are looking well. The veld is splendid and stock are in good condition. There have been several fresh outbreaks of Lungsickness, and nine herds were quarantined during the month. The owners of these herds and those adjoining are anxious to inoculate. Virus was wired for from Grahamstown, but up to the present has not been obtained.

Willowvale.—During the month 8·90 inches of rain have fallen, and the veld is looking well. All stock doing well, and in good condition, but lungsickness and quarter evil are rather prevalent throughout the district. Nearly all mealie crops are affected by the grub.

NOTES ON THE WEATHER OF DECEMBER, 1906.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission.

The closing month of the year was marked by an unusually low mean pressure, and exceptionally cool days; the maximum amount of cloud, the heaviest rainfalls, the largest number of thunder and hail storms and the greatest amount of wind for the period; with heavy and disastrous floods and, unfortunately, some deaths due to the severe lightning.

Division.		Mean Rainfall (1906).	Mean No. of days.	Average Rainfall (1891-1900).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
		Inches.		Inches.		Inches.	Per cent.
Cape Peninsula	..	5·28	10	1·24	4	+ 4·04	+ 326
South-West	..	3·08	7	0·79	3	,, 2·89	,, 366
West Coast	..	1·26	5	0·27	1	,, 0·99	,, 367
South Coast	..	8·61	13	1·93	7	,, 6·68	,, 346
Southern Karoo	..	4·56	8	0·51	2	,, 4·05	,, 794
West Central Karoo	..	2·93	6	0·87	3	,, 2·06	,, 237
East Central Karoo	..	3·16	9	1·00	5	,, 1·26	,, 66
Northern Karoo	..	2·27	5	1·65	4	,, 0·62	,, 38
Northern Border	..	0·72	3	2·04	5	— 1·32	— 65
South-East	..	5·32	14	3·48	9	+ 1·84	+ 53
North-East	..	3·94	11	3·75	8	,, 0·19	,, 5
Kaffraria ..	.	4·69	11	4·36	11	,, ·33	,, 8
Basutoland	..	4·75	12	5·20	12	— 0·45	— 9
Orange River Colony	..	..	..	8·16	7	..	
Durban (Natal)	..	..	..	..	..	..	..
Bechuanaland	..	2·82	8	3·93	8	— 1·11	— 28
Rhodesia ..	..	3·36	13	5·88	12	,, 2·54	,, 43

Precipitation.—The mean rainfall for December, deduced from the records of 360 stations, was 4·30 ins. falling on 10 days, being 2·14 ins. or 99 per cent. over the average. A short consideration of the subjoined table shews that an excess of rainfall was common to eleven out of fifteen sections and was particularly heavy in the west and south. Precipitation was unusually abundant over the Southern Karoo where it was about nine times the usual amount; over the Cape Peninsula, the South-West, the West and South Coasts, it was about four and a half times the normal depth and decreasing to about three and a half times over the West Central Karoo. The excesses in the East and North were much smaller, ranging from 66 per cent. over the East Central Karoo to only 5 per cent. over the North-East. A deficient rainfall, however, amounting almost to a partial drought, was experienced over the Northern Border, where it was 65 per cent. less than the average; Rhodesia, Bechuanaland and Basutoland were similarly affected, although the shortages there were considerably less, varying between 9 per cent. over the last to 48 per cent. over the first. A comparison of the December divisional rainfall with that of the previous month shews an increase in the amounts recorded over the Cape Peninsula, South-West, West Coast, South Coast, Southern, West Central and East Central Karoo, and the South-East, but a decrease elsewhere. As shewing the general and abundant nature of the rainfall during this month, it may be stated that of 360 stations, only three stations reported "Nil" (one being in the Northern Karoo and two in the Northern Border); of the remainder only 29 had 0·01 inch to 1 inch; 45 had 1·01 to 2 inches; 50 had 2.01 to 3 inches; 71 had 3·01 to 4 inches; 61 had 4·01 to 5 inches; 13 had 5·01 to 6 inches; 18 had 6·01 to 7 inches; 15 had 7·01 to 8 inches; 11 had 8·01 to 9 inches; 6 had 9·01 to 10 inches; of the remaining seven stations Swellendam showed the enormous total of 26·72 inches; Heidelberg coming next with 16·63 inches; then in order, Blaauwkrantz, 16·02 inches; Evelyn Valley, 11·66 inches; Zwartberg Pass, 12·52 inches; Walmer Heights (Port Elizabeth), 10·63 inches; and Lottering, 10·58 inches. A scrutiny of the maximum falls in 24 hours shows that although quantities of 2 to 8 inches were met with over nine of the fifteen divisions, amounts exceeding six inches were entirely confined to the South Coast. Of 350 stations supplying particulars, and omitting the three (3) with "Nil," 156 had between 0·01 and 1 inch; 120 had 1·01 to 2 inches; 40 had 2·01 to 3 inches; 13 had 3·01 to 4 inches, and a similar number 4·01 to 5 inches; of the remaining five (5), Shark's River (Nursery), near Port Elizabeth, had 6·15 inches and Blaauwkrantz (Knysna) 6·78 inches, both on the 15th; Zuurbraak had 8·10 inches, Heidelberg 11·37 inches, whilst the enormous quantity of 16·50 inches was reported to have fallen at Swellendam, all three maxima occurring on the 14th. It is not, therefore, surprising to find that many of the sensational features of the weather of September, 1905, which had hitherto been wanting this year, were repeated during December. A washaway occurred on the 11th on the branch railway line to Carnarvon, but the worst effects were produced by the rainfall of the 14th and 15th, when most of the maxima for the month were registered. At Cape Town barometric pressure had been falling from about 10.30 a.m. on Thursday, the 13th, with a gentle southerly breeze, till about 5 a.m. on the 14th when the wind freshened, and rain began to fall from 7 a.m., with thunder and lightning, till about 10.15 a.m.; a boisterous, squally Southerly to S.S. Easterly wind continued with heavy showers till the morning of the 15th. At Port Elizabeth, on the other hand, the barometer was practically steady on the morning of the 14th, but had fallen fully 0·1 inch by the morning of the 15th, drizzling showers setting in about 8 a.m., followed by a thunderstorm and heavy rain at noon, with a renewal of the storm from 4 to 6.15 p.m., after which steady, heavy rain continued till 4 a.m. on the 15th, with clearing showers till 8 a.m. The anemometer records at Port Elizabeth show gentle Westerly winds on the 13th, backing towards the South in the afternoon and dying away practically to a calm till 5.30 a.m. on the 14th. The wind then strengthened, veering to E.S.E from which direction it continued to blow till 4.45 p.m. on the 15th when it veered right round the compass to S.E., gradually backing to South from which direction it continued to blow all the 16th. Between 9 a.m. on the 14th and 4 p.m. on the 15th the mean wind-velocity was 31 miles per hour, attaining a maximum of 41 miles between 6 and 7 a.m. on the 15th, gradually decreasing thereafter till the afternoon of the 16th. These few details have been given as this is one of the few authentic instances of a South-East rain-bearing wind affecting the Cape Peninsula and further east, along the coast. During these two days (14th and 15th) heavy floods were experienced all over the South West but particularly along the South Coastal districts, causing enormous damage to railways, bridges, houses, lands, &c, as well as the loss of large numbers of live stock and washing away crops ready for harvesting. The heaviest rains appear to have occurred between Swellendam and Riversdale where the rivers are said to have risen higher than had been known before, washing away a great deal of fertile land, flooding houses, &c. To give a detailed account of the havoc wrought by these disastrous floods is practically impossible but the following notes will sufficiently indicate its nature and extent. At Heidelberg, many houses were flooded and damaged, roads washed away, railway embankments undermined, farmsteads carried away, and two people unfortunately drowned; at Robertson, bridges were broken and hundreds of sheep and goats lost, vineyards and fields damaged, &c., as was also the case at Montagu and Swellendam: the greatest amount of damage seems to have been done at Swellendam, where 120 houses were reported to have been destroyed, the Klip River Bridge swept away, as well as portions of the railway line, culverts and embankments at Buffeljagt's River, rivers changed their courses, etc., the village of Malagas was practically swept away; some houses were damaged at Bredasdorp, but those at Melkkammer, Langvlei, Reiner's Kraal and Martha were utterly destroyed: portions of the Oudtshoorn-Klipplaat railway in Tooverwaterspoort and near Wilge River, as well as the railway bridge at Harlem on the Port Elizabeth-Avontuur line were washed away: a gentleman was drowned when crossing New Year's River near Grahamstown; a train was derailed near Dwyka, owing to a washaway on the line, and three persons killed; losses of crops and stock were heavy all over these districts, also at George, Riversdale, Touws River, etc. This storm seems to have extended to Natal, where a severe storm broke over Maritzburg on the 15th, flooding parts of the town and causing the destruction of part of a suburban train as well as the drowning of five coloured people. Truly a heavy death roll! These floods along the South Coast have been stated to exceed those of February, 1902, when 12·60 inches were recorded at Swellendam, 9·96 inches at Heidelberg, and 5·95 inches at Riversdale on two days. On the other hand many parts of the interior have greatly benefited by the abundant rains—the dams being filled, with every promise of an abundant harvest, notwithstanding the ravages of locusts; at Carnarvon Farm the country is stated to be "a blaze of flowers, and grass 18 inches to 3 feet high," whilst the rains were particularly beneficial to the fruit growing districts in the South West. *Thunderstorms* were more numerous and widespread than during any previous month of the year, 755 instances being noted on the thirty-one days of the month, more particularly on the 4th, 7th, 10th, 12th, 14th, 15th, 18th, 24th, 28th, 29th and 31st. Unfortunately these storms caused a considerable amount of damage, with loss of life in some instances, *e.g.* on the 14th, a farmhouse, near Richmond, was struck and gutted, and a number of cattle killed; at Strydfontein, near Kroonstad, a Kafir woman was killed and the hut destroyed on the 19th; at Aliwal North houses in the town were struck and a horse and mule klled on the commonage, etc. *Hailstorms* were also at their maximum for the year, being reported from 62 stations on 17 days, particularly the 15th, 29th and 4th. These were also frequently of a destructive nature; *e.g.*, at Aberdeen on the 4th, hailstones fell over three-quarters of an inch in diameter, causing serious damage to grapes, peaches, apples, etc., as well as shattering window panes; at Middleton, storms on the 7th, 15th and 19th ruined practically all mealie and forage crops lying in their path, the hailstones on the 7th being stated to be the size of a man's fist; most of the fruit at Kokstad was damaged by the hail, while a few disastrous hailstorms of limited extent were reported from Carnarvon Farm. No *Snow* or *Sleet* was noted.

Temperature, Cloud and Wind.—The mean temperature of all the stations was only 66·2° or 2·1° lower than the average and only 1·4° warmer than November. This unusually low temperature was caused solely by a deficiency in the effect of solar radiation, the mean maximum (76·4°) being 4·1° lower than the normal, whilst the mean minimum (56·1°) was the same as the average. There was thus a decrease in the mean daily range of 4·1°. The days were cooler than usual over almost the whole country by amounts varying between 0·6° at Umtata and Kokstad and 6·7° at O'okiep; the only exceptions were the stations of Port Nolloth and King William's Town, where there were slight excesses of about half a degree. The mean minimum temperatures varied considerably compared with the averages from an excess of 2·8° at Port Nolloth to a deficit of 3·9° at O'okiep. The mean monthly temperatures were practically everywhere below the normal by amounts varying between 0·5° at Van Staaden's River, and 5·4° at O'okiep, the only exceptions being Port Nolloth, Sydney's Hope, Kokstad and Hopefountain, which were slightly warmer than usual The mean warmest station was Kimberley (74·3°), and the mean coolest Devil's Peak (60·8°), shewing a range of only 13·5°. The highest mean maximum temperature is found to be 89·7° at Kimberley and the lowest mean minimum 48·2° at Teyateyaneng in Basutoland. The warmest period was mostly from the 6th to the 11th, the greatest number of maxima for the month being noted on the 8th, although some of the highest readings occurred also on the 4th, 22nd, 24th, 30th and 31st. The lowest temperatures were recorded on 13 days of the month and varied greatly, being, however, most common on the 6th, 22nd and 23rd. The mean of the highest readings was practically the same as in November being only 90·4° although the mean of the lowest (47·0°) was 3·4° above the corresponding value for the previous month, causing a reduction in the mean monthly range to 43·4°, or 3·5° less than in November. There was a marked absence of high temperature, the absolute maximum for the month being only 100·0° at Amalienstein on the 8th and 9th, whilst the corresponding minimum was 34·0° at Mohalie's Hoek on the 2nd, an extreme monthly range of 66°. *Frosts* were reported from 4 stations, Cofimvaba on the 11th; Fort Fordyce on the 17th, when beans and potatoes were killed; Sutherland on the 21st, where potatoes were also affected; and, lastly, at Quagga's Kerk on the 23rd. The mean percentage of *Cloud* was exceptionally high (53 per cent.) being 4 per cent. more than last month. It was remarkably uniform in distribution, ranging from 74 per cent. at Port St. John's and Danger Point to 23 per cent. at Kenhardt, the only station having less than 35 per cent. *Fogs* or *Mists* were much less numerous than usual, being reported from only 32 stations on 28 days, particularly the 12th and 16th; this number is less than half that for November, the only days on which this phenomenon was not noted being 3rd, 18th and 23rd.

The prevailing winds were most generally Easterly to South-Easterly in the West, but Westerly (N.W. to S.W.) in the centre and east of the Colony, but North-Easterly at Kimberley, South-Easterly at Aliwal North and Hopefountain. Over the Cape Peninsula there was a large decrease in the number of Southerly winds but a marked increase in those from S.E. and from points between N.N.W. and S.S.W. The mean wind-force (2·16 on the Beaufort scale, corresponding to a velocity of 13·8 miles per hour) was the highest for the twelve months. Similarly *Gales* were more numerous than in any previous month, occurring on 14 days at 30 stations, more particularly on the 4th and 23th. *Duststorms* were noted on 4 days at 4 places; and *Hot Wind* at an equal number of stations on 3 days.

An *Earthquake Shock* was felt at Kokstad at 2.45 a.m. on the 20th; also at Vryheid, Paulpietersburg and Hlabisa on the 10th.

OBSERVERS' NOTES.

VRUCHTBAAR.—The rain during the month was most welcome for both fruit and vine crops, as the heavy bearing of vines and trees this season made an extra amount of moisture badly needed. Apricot drying is in full swing now; an excellent crop of dried apricots and mebos will be available for the market in this district.

KRAAIFONTEIN (NAMAQUALAND.)—Weather unsettled during the month.

GREAT BRAK RIVER.—Forage crops badly damaged by the heavy rains wheat crops but slightly. Most of wheat has not yet been reaped.

MIDDLETON.—The Hailstorms of 7th, 15th and 19th ruined all mealie and forage crops on the farms this storm passed over. On the 7th the hail was the size of a man's fist.

ROODEBLOEM.—Veld in good order; stock in fine condition. Mealies look promising; heavy crops of lucerne.

THEEFONTEIN.—Veld badly damaged by locusts—voetgangers and flyers. Crops in most cases saved. A very wet month considering time of year; winds light and variable.

THE MEADOWS.—Weather this month has been very windy and fine, but no damage done.

VOSBURG.—Country in a flourishing state; harvest good.

ALEXANDRIA.—Crops healthy, but considerably destroyed by the rain.

SUNNYSIDE (ALBANY.)—Everything very backward owing to rain.

ALIWAL NORTH.—Houses in town struck by lightning on 29th, also horse and mule killed thereby on commonage, and just out of town.

CARNARVON FARM.—This has been the wettest December for the last six years, 4·01 inches, being nearly double any other December. The nearest approach was 1895, when we had 2·64 inches. The last four months are the wettest September, October, November and December—on record, 11·76 inches. A foot of rain just when most wanted; result: phenomenal mealie crops will be reaped everywhere. Oats and wheat, barley, rye, etc., fairly good, in some instances A1. The country is a blaze of flowers, and grass 18 inches to three feet high. Dam all full, and fountains strong. A few disastrous hailstorms, but nothing very general. Locusts—large swarms everywhere, but owing to the oceans of green grass, the least driving and smoking clears them off. All stock fat. Frosts nil here; one on Stormberg. Windy days, 9; cloudless—nil.

STERKSPRUIT.—Very few locusts seen here so far.

THIBET PARK.—Grand rains during the month, the best for years.

KENTANI.—Lung sickness prevalent on every Location in district, and continually spreading.

KOKSTAD.—All rivers running strong. Crops looking healthy. Veld very good. Lightning very vivid and dangerous.

GROOT DRAKENSTEIN.—Mean temperature of month 1·6° below average seven years, and 1·1° below last month. Mean maximum of month 4·1° below average seven years. Rainfall 1·69 above mean of 13 years. Mean temperature of year 0·3° below average seven years. Rainfall of year 10·91 inches below mean of 13 years, or only 70 per cent. of mean (36·70.)

KOKSTAD (THE WILLOWS.)—Low barometric pressure throughout the month; temperature also lower than is usual in December. A fair amount of rain has fallen, but little above the average. A sharp shock of earthquake was felt in the early morning of 20th. Rainfall for year = 39·99 inches, as against 32·87 inches for 1905. Grass is plentiful. Fruit left by frost all more or less damaged by hail.

TEMPERATURE, DECEMBER, 1906.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory	75·0	58·3	66·6	92·5	6	50·8	23
Sea Point	73·9	58·5	66·2	90·6	6	51·0	27
Simon's Town	74·5	60·4	67·5	89·5	6	54·2	1
Cape Town (Hospital)	73·3	58·0	65·6	92·0	6	52·0	23
Devil's Peak	69·8	51·8	60·8	87·0	6	45·0	1 & 2
Groot Drakenstein	78·6	58·2	68·4	95·7	8	50 4	23
Wynberg	71·5	55·0	63·2	86·5	8	49·0	23
Robertson (Govt. Plantation	80·5	56·7	68·6	100·0	8	48·0	21
Elsenburg Ag. College	77·4	56·2	66·8	93·2	8	47·0	27
Port Nolloth	66·1	55·2	60·6	70·0	11	47·0	26
O'okiep	77·8	54·3	66·0	97·0	8	45·0	5
Van Staaden's River	75·3	56·6	65·9	96·0	8	47·0	26
Port Elizabeth	71·0	59·4	65·2	82·0	10	54·0	26
Heidelberg	76·8	58·8	67·8	95·0	8	52·0	14 & 24
Mossel Bay	72·4	59·7	66·0	83·0	9	51·0	22
Cape L'Agulhas	69·7	59·7	64·7	75·0	8	54·0	11 & 26
George (Plantation)	72·1	56·3	64·2	91·5	9	48·0	6
Cape St. Francis	69·3	60·0	64·6	78·0	30	52·0	22
Amalienstein	85·4	56·1	70·8	100·0	8 & 9	45·0	22
Murraysburg	81·6	54·7	68·2	96·0	8 & 9	43·0	21
Hanover	79·5	50·9	65·2	93·0	8	42·0	23
Kimberley	89·7	58·9	74·3	99·0	8	46·0	2
Bedford	77·4	53·8	65·6	96·0	11	41·0	6
East London	70·9	60·0	65·4	78·0	30	52·0	6
King William's Town	79·0	58·5	68·8	98·0	7	47·0	5
Cathcart	73·9	54·0	63·9	89·6	31	41:6	6
Sydney's Hope	75·0	55·6	65·3	94·8	7	47·2	6
Stutterheim	75·3	56·4	65·8	95·5	10	46·0	6
Aliwal North	80·1	54·0	67·0	91·0	10	44·0	6
Rietfontein	77·6	52·0	64 8	88·0	8	40·2	23
Mount Ayliff	77·9	55·4	66·6	92·0	24	45·0	21
Main	76·0	55·4	65·7	92·8	10	40·2	6
Tabankulu	76·0	54·3	65·2	90·0	4	44·0	22
Port St. John's	77·0	63·6	70·3	85·0	4	57·0	22
Umtata	79·0	57 7	68·4	94·0	10	50·0	23
Kokstad (The Willows)	75·2	52 2	63·7	86·5	4	43·6	22
Teyateyaneng	79·6	48·2	63·9	92·0	11	40·0	2
Leribe	76·0	52·4	64·2	85·4	8	41·7	1
Mohalie's Hoek	77·7	49·6	63·6	90·0	11	34·0	2
Kuruman	85·1	56·4	70·8	98·6	10	46·0	2
Hope Fountain	83·0	59·2	71·1	93·1	22	50·0	10
Means	76·4	56·1	66·2	90·4	..	47·0	..
Extremes	..	..	..	100·0	8 & 9	34·0	2

RAINFALL, DECEMBER, 1906.

I. CAPE PENINSULA:

	INCHES
Royal Observatory (a) 12 inch gauge	3·23
Cape Town, Fire Station	3·92
Do. Signal Hill	2·59
Do. Hospital	2·29
Sea Point (The Hall)	3·27
Do. (Attridge)	3·38
Camp's Bay	1·75
Table Mountain, Kasteel Poort	9·15
Do. Waai Kopje	9·09
Do. St. Michael's	9·14
Devil's Peak Blockhouse	5·95
Do. Nursery	5·75
Do. Lower Gauge	1·84
Woodstock (The Hall)	4·11
Do. (Municipal Quarry)	5·25
Do. (Do. Nipher's Shield)	7·18
Newlands (Montebello)	7·29
Bishopscourt	7·89
Kenilworth	6·44
Wynberg (St. Mary's)	7·22
Groot Constantia	5·72
Tokai Plantation	5 76
Plumstead (Culmwood)	5·45
Muizenberg (St. Res.)	7·17
Simon's Town (Wood)	5·40
Do. (Gaol)	4·03
Cape Point	1·79
Robben Island	1·77
Maitland Cemetery	3·57
Tamboer's Kloof (Monte Vista)	4·16

II. SOUTH WEST:

Eerste River	3·28
Klapmuts	1·62
Stellenbosch (Gaol)	1·75
Somerset West	3·40
Paarl	2·45
Wellington (Gaol)	2·48
Groot Drakenstein (Weltevreden)	2 80
Porterville Road	2·25
Tulbagh	2·76
Ceres	4·35
Rawsonville	2·91
Worcester (Gaol)	2·27
Do (Station)	2·55
Hex River	3·12
Karnmelks River	5·32
Robertson (Gaol)	7·30
Do. (Govt. Plantation)	6·48
Montagu	7·87
Danger Point	4·44
Vygebooms River	6·68
Elsenburg Agricultural College	1·44
Roskeen	4·88
Vruchtbaar	3·45

III. WEST COAST:

	INCHES
Port Nolloth	0·57
Anenous	1·43
Klipfontein	1·19
Kraaifontein	1·06
O'okiep	0·96
Springbokfontein	1·33
Garies	0·36
Lilyfontein	1·85
Van Rhyn's Dorp	1·31
Clanwilliam (Gaol)	0·61
Dassen Island	1·26
Kersefontein	1·11
The Towers	1·77
Malmesbury	1·66
Piquetberg	2·37
Zoutpan	1·07
Wupperthal	1·26
Welbedacht	1·58

IV. SOUTH COAST:

Cape Agulhas	4·57
Bredasdorp	5·94
Swellendam	26·72
Zuurbrak	15·11
Heidelberg	16·63
Riversdale	8·50
Vogel Vlei	7·72
Mossel Bay	5·66
Great Brak River	5 71
George	8 02
Do. (Plantation)	8·36
Woodifield (George)	8 11
Buffel's Nek	6·68
Harkerville	8·85
Blaauwkrantz	16·02
Lottering	10·38
Witte Els Bosch	6·08
Cape St Francis	6·91
Van Staaden's (Intake)	8·16
Do. (on Hill)	7·78
Kruis River	5 08
Uitenhage (Park)	5·19
Armadale (Blue Cliff)	5 95
Port Elizabeth (Harbour)	5·70
Do. (Walmer Heights)	10·63
Shark's River (Nursery)	8·90
Do. (Convict Station)	6·95
Centlivres	4·67

V. SOUTHERN KAROO.

Ladismith	5·62
Amalienstein	7·51
Calitzdorp	5·70
Oudtshoorn	2·17
Uniondale	2·53
Kleinpoort	3·82

VI. WEST CENTRAL KAROO :

	INCHES
Fraserburg Road	0·66
Prince Albert	2·94
Zwartberg Pass	12·52
Beaufort West (Gaol)	2 50
Nel's Poort	0·82
Camfers Kraal	1·00
Baaken's Rug	1·16
Willowmore	3·27
Rietfontein	3 18
Steytlerville	2·47
Krom River	1·70

VII. EAST CENTRAL KAROO :

Aberdeen (Gaol)	3·80
Corndale	2 82
Aberdeen Road	2·33
Klipplaat	1·66
Winterhoek	3·94
Klipdrift	2·50
Kendrew (Holmes)	5·95
Graaff Reinet (Gaol)	2 37
Do. (Eng. Yard)	2·13
New Bethesda	2·15
Roodebloem	1·38
Glen Harry	1·37
Wellwood	2·04
Do. (Mountain)	1·60
Bloemhof	1·69
Jansenville	3·72
Patrysfontein	2·79
Bethesda Road	2·19
Roode Hoogte	4·43
Toegedacht	3·91
Klipfontein	2·88
Cranemere	3·54
Pearston	3·57
Darlington	4·13
Walsingham	2 95
Middlewater	4·90
Somerset East (Gaol)	5·80
Middleton	3·62
Spitzkop (Graaff-Reinet)	2·23
Bruintjes Hoogte	4·14

VIII. NORTHERN KAROO :

Calvinia	1·06
Sutherland	0·69
Fraserburg	0·34
Rhenoksfontein	0·00
Carnarvon	0·66
Brakfontein	1·52
Victoria West	0·69
Omdraais Vlei	0·50
Doorskuilen	0 50
Britstown	0·89
Wildebeestkooij	0·78
Murraysburg	1·41
De Kruis (Murraysburg)	1·52
Theefontein	2·73
Jackalsfontein	3·21
Ezelpoort	3·00
Plaatberg	4·24
Grape Vale	3·19
Ezelfontein	3·75
Roodepoort	3·08

VIII. N. KAROO :—*continued.*

	INCHES
Groenkloof	3·00
Vlakfontein	3·75
Vogelsfontein	3·41
Plaatfontein	2·65
Fish River	4·40
Varkens Kop	1·96
Culmstock	1·39
Droogefontein	2·42
Cradock (Gaol)	2·73
Witmoss	3·86
Maraisburg	2·43
Steynsburg (Gaol)	3·24
Hillmoor	1·59
Quagga's Kerk	3·64
Tarkastad	3·42
Do. (Dis. Engineer)	3·53
Waverley	3·50
Gannapan	0·75
Schuilhoek	2·25
Vosburg	0·74
Zwavelfontein	1·98
The Meadows (Schoombie)	1·59
Cradock (Station)	2·52
Arundel (Colesberg)	1·48
Gondfontein (Div. Middelburg)	4·32

IX. NORTHERN BORDER :

The Halt	0·10
Kenhardt	0·01
Upington	0·00
Trooilapspan	0·00
Van Wijk's Vlei	0·56
Prieska	0·63
New Year's Kraal	0·82
Dunmurry	0·77
Karree Kloof	0·72
Griquatown	0·53
Douglas	0·75
Avoca (Herbert)	1·14
Newlands (Barkly West)	1·78
Barkly West	2·08
Kimberley (Gaol)	0·98
Do. Stephens	1·12
Strydenburg	0·60

X. SOUTH-EAST :

Melrose (Div. Bedford)	3·93
Dagga Boer	3·12
Fairholt	4·47
Lynedoch	4·57
Alicedale	4·80
Cheviot Fells	3·06
Bedford (Gaol)	5·19
Do. (Hall)	4·56
Sydney's Hope	6·52
Cullendale	4·22
Adelaide	4·06
Alexandria	5·87
Salem	5·89
Fort Fordyce	7·17
Grahamstown (Gaol)	8·07
Heatherton Towers	4·89
Sunnyside	6·82
Fort Beaufort	4·21
Katberg	7·50

X. SOUTH-EAST—*continued*

	INCHES
Seymour	3·91
Glencairn	7·42
Port Alfred	6·90
Hogsback	8·67
Peddie	1·22
Exwell Park	3·95
Keiskamma Hoek	5·08
Cathcart (Gaol)	3·24
Do. (Forman)	3·61
Do.	3·42
Thaba N'doda	8·28
Evelyn Valley	14·66
Crawley	1·97
Thomas River	4·69
Perie Forest	8·85
Forestbourne	9·66
Isidenge	9·67
Kologha	5·35
King William's Town (Gaol)	4·87
Do. (Dr. Egan)	5·04
Stutterheim (Besté)	4·22
Fort Cunynghame	4·75
Kubusie	5·19
Quacu	4·38
Blaney	3·10
Kei Road	5·11
Bolo	4·27
Fort Jackson	3·30
Prospect Farm (Komgha	3·46
Komgha (Gaol)	2·74
Chiselhurst	5·79
East London West	5·04
Cata	6·71
Wolf Ridge	6·32
Dontsah	9·23
Mount Coke	3·90
Blackwoods	3·96
Albert Vale (near Bedford)	3·41
Heatherton (Irrigation Works)	4·08

XI. NORTH-EAST:

Venterstad	1·53
Burghersdorp (Gaol)	2·60
Ellesmere	2·72
Molteno	3·02
Lyndene	2·80
Cyphergat	4·72
Thibet Park	6·07
Sterkstroom (Station)	4·95
Do. (Gaol)	4·59
Rocklands	2·40
Aliwal North (Gaol)	3·94
Do. (Brown)	4·28
Do. (Dist Engineer)	4·34
Buffelsfontein	4·21
Poplar Grove	3·32
Carnarvon Farm	4·01
Halseton	5·00
Jamestown	3·28
Whittlesea	3·40
Rietfontein (Aliwal North)	3·54
Middlecourt	4·30
Tylden	5·85
Nooitgedacht	3·87

XI. NORTH-EAST—*continued.*

	INCHES.
Herschel	3·21
Lady Grey	3·61
Lady Frere	1·81
Contest (near Bolotwa)	3·76
Sterkspruit	1·15
Doornkop	5·65
Barkly East	2·50
Blikana	6·11
Rhodes	4·01
Albert Junction	2·02
Queenstown (District Engineer's Office)	4·27
Glenwallace	1·10
Indwe (District Engineer's Office)	4·80
Bensonvale Inst. (Herschel)	4·51
Cathcart (Queenstown)	3·68

XII. KAFFRARIA

Ida (Xalanga)	1·51
Cofimvaba	1·21
Tsomo	4·68
N'qamakwe	4·11
Main	4·39
Engcobo	5·17
Butterworth	3·36
Kentani	6·55
Maclear	4·00
Idutywa	2·46
Bazeya	7·98
Willowvale	5·17
Mount Fletcher	3·40
Somerville (Tsolo)	3·33
Elliotdale	3·17
M'qanduli	3·28
Matatiele	1·18
Umtata	3·94
Cwebe	1·89
Tabankulu	5·87
Kokstad	3·58
Do. (The Willows)	1·15
Flagstaff	5·57
Insikeni	4·01
Port St. John's	6·01
Umzimkulu	5·89
Wanstead	5·11
Elliot	7·06

XIII. BASUTOLAND:

Mohalies Hoek	3·81
Maseru	3·51
Teyateyaneng (Berea)	4·11
Qacha's Nek	5·11
Leribe	6·71

XVII. BECHUANALAND.

Taungs	1·87
Vryburg	2·02
Mafeking	3·20
Setlagoli	2·04
Kuruman	3·19

XVIII. RHODESIA:

Hopefountain	3·36

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) o Agricultural Produce on Saturday, the 2nd February, 1907, ruling at the several centres named, is published for general information:—

CENTRE.	A. Wheat per 100 lb.	B. Wheat Flour per 100 lb.	C. Boer Meal per 100 lb.	D. Mealies per 100 lb.	E. Mealie Meal per 100 lbs.	F. Barley per 100 lb	G. Oats per 100 lb.	H. Oat-hay per 100 lb.	J. Potatoes per 100 lb.	K. Tobacco (Boer Roll) per lb.	L. Beef per lb.	M. Mutton per lb.	N. Fresh Butter per lb.	O. Eggs per doz.	P. Cattle (Slaughter)	Q. Sheep (Slaughter)
	£ s d	£ s. d.	£ s d	£ s. d.	£ s. d.	s. d.	s. d.	£ s. d	£ s. d.	£ s. d.	s. d	s. d.	£ s. d	s. d		
Allwal North	0 8 0	0 15 0	0 13 0	0 8 6	0 4 6	7 6	8 0	0 4 6	0 4 6	0 1 0	8d to 9d	6d to 8d	0 0 8	1 9	£9 to £10	21/- to 24/-
Beaufort West	0 12 0	0 16 6	0 12 6	0 10 0	0 12 6	10 0	9 0	0 5 6	0 7 6	0 0 10	*6d to 1s	*6d to 7d	0 1 6	1 6	£15	23/6
Burghersdorp	...	...	...	...	...	...	...	0 4 6	0 2 6	...	*0 6	*0 6	0 0 11	1 0	...	...
Capetown	...	...	...	...	...	...	...	...	3/8 to 4/-	...	...	...	1/- to 1/3	1/9 to 1/11	...	...
Clanwilliam	11/- to 11/6	...	11/9 to 12/3	0 9 0	...	7/6 to 9/-	7/6 to 8/-	0 7 0	0 5 0	1/- to 1/3	7d. to 8d.	6d to 8d	0 1 6	1 0	£7 to £12	16/- to 20/-
Colesberg	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cradock	...	...	...	...	...	6	...	0 2 9	0 3 0	...	...	0 7½	0 0 8	1 9	...	...
Dordrecht	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
East London	0 11 0	0 11 6	0 10 9	0 6 9	0 10 0	6 0	9 0	0 3 6	0 6 9	0 1 6	†7d & *9d	†7d & *9d	0 1 0	1 8	£22	37/6
Graaff-Reinet	0 10 0	...	...	0 8 6	...	5 6	...	0 3 6	0 7 6	0 0 5	0 5	0 6	0 1 0	1 3	£10	17/6
Graham's Town	0 8 0	...	...	0 8 0	...	4 0	6 9	0 4 0	0 3 6	0 0 6½	0 6½	0 7	0 1 4	1 11	...	...
Kimberley	0 10 6	0 15 0	0 13 0	0 7 6	0 8 0	7 0	8 6	0 5 6	0 15 0	0 0 7	0 9	0 8	0 1 3	1 6	£12 to £14	18/- to 20/-
King Wm's Town	0 8 0	0 14 3	0 12 0	0 6 0	0 8 6	6 0	6 6	0 3 9	0 4 0	0 0 4	0 6½	0 6½	0 1 0	1 6	£16	£1 2s. 6d.
Malmesbury	0 7 6	0 14 6	0 10 6	0 7 6	0 9 0	10 0	6 0	0 3 6	0 7 6	0 1 0	0 6½	0 5	0 1 4	1 3	£13	£1 4s. 3d.
Mossel Bay	...	...	...	0 18 0	...	...	...	...	0 16 6	...	...	...	...	...	...	...
Port Alfred	0 10 0	0 16 0	0 14 0	0 10 0	0 12 6	5 0	6 0	0 4 0	0 4 0	0 1 0	0 8	0 8	0 1 0	1 9	...	...
Port Elizabeth	0 8 6	...	...	0 7 6	...	4 6	6 0	0 3 0	0 9 0	0 0 3	0 6	0 7	0 0 10	1 9	...	...
Queen's Town	0 6 3	0 10 3	0 8 0	0 5 6	0 6 0	5 3	6 6	0 5 3	0 6 0	0 1 0	*0 6	*0 7	0 0 8	1 6	£12 15s 0d.	20/- to 30/-
Tarkastad	0 11 6	0 13 6	0 12 6	0 8 6	0 10 0	5 6	10 0	0 4 0	0 5 0	0 1 0	*0 6	*0 7	0 0 8	1 3	£10	20/-
Vryburg	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Worcester	0 9 0	0 14 0	0 10 9	0 7 9	0 8 9	6 6	6 6	0 3 9	0 3 6	0 0 6	*6d to 9d †5d to 8d	*6d †5½d	0 1 6	1 0	£10 to £15	22/- to 25/-

NOTE.—A blank space denotes "no transactions." *Colonial. ozen

DEPARTMENTAL NOTICES.

Transport of Officers: Department of Agriculture.

It is hereby notified for general information that, from and after the 1st January, 1907, when advice or assistance is asked for by the public from Officers of this Department, the person seeking such advice or assistance must provide free conveyance for the Officer concerned, from the nearest or most convenient railway station or the nearest postal terminus to his place of residence.

D. HUTCHEON,

Director of Agriculture.

December 17th, 1907.

Sheep Dip Depots.

Importers or Agents of Approved Government Sheep Dips are hereby notified that the following are the conditions under which such Dips may be stocked for sale at the Government Dip Depots until October, 1907:—

1. The prices shall be those mentioned in Government Notice No. 73 of 1907, and in any addition thereto or amendment thereof, but they may be reduced if desired by the Dip Agent or Importer.
2. The Dips need not necessarily be supplied at every Depot.
3. No Dip shall be transferred from a Depot to another Depot or to a dealer.
4. Railage on approved Sheep Dips, Dipping Tanks, Tobacco, Sulphur and Receptacles used in connection with the dipping of Sheep will be free, subject to the published Regulations, and provided that they are intended for use solely in the Cape Colony, including the Transkeian Territories.
5. The cost of Road Carriage will also be borne by the Government, subject to the published Regulations.
6. The prices will be for sale on cash basis with monthly settlements by Depot keepers. There will be no added Depot charges either for storage or commission.
7. Government will be responsible for the safe keeping of packages containing dip, subject to insurance against fire by the Consignor; but will not be liable for depreciation from defective packing or for ordinary leakage.
8. Any claim in respect of Dip sent to any Government Dip Depot must, before it can be entertained, be supported by the written receipt for such Dip, signed by the Depot Agent duly appointed as such by the Government. Claims will not be recognised unless full particulars are given within three months of the date of enquiry by this Department.

D. HUTCHEON,

Director of Agriculture.

February 1st, 1907.

Scrub Exterminator.

It is hereby notified that application for Scrub Exterminator (Arsenite of Soda) for the eradication of Prickly Pear and Jointed Cactus, accompanied by the necessary remittance, must be made to the Magistrate of the District in which the land to be cleared is situated.

The Scrub Exterminator will be obtainable at any depot now or hereafter established for the purpose, at a prepaid charge of £1 10s. (one pound ten shillings sterling) per drum containing 140 lbs., and £1 1s. 6d. (one pound one shilling and sixpence sterling) per drum, containing 100 lbs., delivered at the depot.

The depots at present established are shewn in the Schedule hereto.

D. HUTCHEON,
Director of Agriculture.

January 31st, 1907.

Schedule.

Aberdeen—Civil Commissioner's Office.
Adelaide—J. Lamont.
Alexandria—Civil Commissioner's Office.
Bedford—Kilfoil Brothers.
Cookhouse—Macdonald Brothers.
Cradock—S. G. N. Webber & Co.
Fort Beaufort—Civil Commissioner's Office.
Graaff-Reinet—Tunstall & Co.
Grahamstown—J. H. Parker.
Humansdorp—Civil Commissioner's Office.
Jansenville—J. F. Heydenrich, Jansenville, C. Lee, Claremont, Klipplaat.
King William's Town—Civil Commissioner's Office.
Murraysburg—Civil Commissioner's Office.
Oudtshoorn—P. Matare.
Port Elizabeth—Civil Commissioner's Office.
Queenstown—Civil Commissioner's Office.
Somerset East—Berry & Co., Somerset East, G. Webster, Middleton Nek, C. W. Smuts, Pearston.
Steynsburg—Civil Commissioner's Office.
Steytlerville—Civil Commissioner's Office.
Stockenstroom—Civil Commissioner's Office.
Swellendam—Civil Commissioner's Office.
Tarkastad—Civil Commissioner's Office.
Uitenhage—A. Mattheo, Kleinpoort, Civil Commissioner's Office.
Umtata—Resident Magistrate's Office.
Willowmore—Civil Commissioner's Office, W. Geard, Heuvel Kraal.

Inspection of Fruit for Export.

It is hereby notified for general information that from and after this date the Government will institute, at the Cape Town Docks, on the subjoined conditions, a system of inspection of fruit intended for export.

It has been arranged that such inspection shall be carried out personally by Mr. R. J. BULMER or Mr. A. C. BULLER, or both. Exporters may be present at the inspection of their fruit.

Conditions.

1. Each intending exporter of fruit who wishes to avail himself of inspection by a Government officer (hereafter called the Inspector) at the Cape Town Docks, of all fruit which he proposes to export, must previously intimate to the Director of Agriculture, Cape Town, that he desires to do so, and accepts these conditions, stating at the same time the distinctive mark which he will place on his fruit boxes, whereupon he will be informed that his name and address and distinctive mark have been registered, and his fruit will be accepted, from and after a stipulated date, by the Inspector for examination prior to shipment.

2. Any registered exporter of fruit who thereafter may wish to withdraw from such inspection can do so upon giving to the Director of Agriculture, Cape Town, seven clear days' notice of such intention.

3. Every box of fruit considered by the Inspector as suitable for export will be branded by him with the Cape of Good Hope Coat of Arms encircled by the words "Passed by Government Inspector," and for each consignment examined by him a charge at the rate of 1s. 6d. per 40 cubic feet (less than ½d. per box) will be made to the exporter.

4. The disposal of boxes of fruit not passed and branded by the Inspector in terms of Condition 3, and for that reason desired not to be exported, must be arranged by the exporter with the Harbour Board. (Any fruit not passed by the Inspector and belonging to an exporter who has not indicated to the Harbour Board what steps he wishes to have taken with regard to such fruit, will be shipped to England without the Government brand.)

5. Every registered exporter must pay to the Harbour Board the charges for cold storage and make his own arrangements for the disposal of his fruit in Europe.

6. The size of box in which fruit is packed for export must be, for all classes of fruit, either 18 by 12 inches or 18 by 24 inches the depth being optional.

7. Every box of fruit submitted for inspection

(*a*) Must be clearly marked, *on one end thereof*, with the registered mark of the exporter, or his name or other means of identification, and, except in the case of grapes, with the grade (either "extra selected" or "selected"), the variety and the number of fruits contained therein.

(*b*) Must be consigned to The Dock Superintendent, Cape Town, and also bear the address of the agent appointed by him for disposal of his fruit in Europe.

8. All fruit, other than grapes, *must* be wrapped in tissue paper, and *may* in addition be placed in wood wool. Grapes *must* be placed in wood wool, and *may* also be wrapped in tissue paper.

9. All fruit, other than grapes, must be divided into two grades, namely, "extra selected" and "selected," but no second rate fruit can be marked "selected."

10. All fruit must be first rate quality, free from all blemishes affecting the appearance of the fruit, evenly graded and uniform in size, of the characteristic shape of its variety; and only one variety of fruit must be placed in a single box. Any box containing fruit which fails in any of these requirements or is of a variety specified hereunder as unsuitable for export will not receive the Government brand.

11. All fruit must arrive at the Harbour Board Cold Storage, Docks, Cape Town, not later than Sunday morning to permit of shipment by the steamer sailing on the following Wednesday, unless special arrangements have been made with the Union-Castle Steamship Company regarding cold storage by the exporter elsewhere than at the Docks; in which latter event the fruit must arrive at the Harbour Board Cold Storage in time for inspection, and must be accompanied by a certificate that it has been in cold storage for 48 hours prior to forwarding, and has been forwarded to the Harbour Board Cold Storage in refrigerator car.

12. The under-mentioned are the minimum sizes of fruit which can be submitted for inspection as "extra selected" and "selected" respectively, and the varieties which will not receive the Government brand. Owing to shrinkage it is recommended that all stone-fruits be graded ⅛ inch larger than the sizes mentioned.

Apples.

No minimum size is fixed, but the fruit must not be small.

Varieties ripening prior to Ribstone and Jonathan will not receive the Government brand.

Pears.

	Grades.	
	"Extra Selected."	"Selected."
D'Angouleme	3½ inches.	2¾ inches.
Easter	3½ ,,	2¾ ,,
Diel	3½ ,,	2¾ ,,
Clapp's	3½ ,,	2¾ ,,
Keiffer	3½ ,,	2¾ ,,
Pitmaston	3½ ,,	3 ,,
Cape Kalabas	3½ ,,	3 ,,
Safraan	3½ ,,	3 ,,
Glout	3¼ ,,	2½ ,,
Bon Chretien	3 ,,	2½ ,,
Comice	3 ,,	2½ ,,
Magnate	3 ,,	2½ ,,
Souvenir du Congress	3 ,,	2½ ,,
Winkfield	3 ,,	2½ ,,
Gansel's Bergamotte	3 ,,	2½ ,,
Clairgeau	3 ,,	2½ ,,
Beurre Hardy	2¾ ,,	2¼ ,,
Louis Bonne	2½ ,,	2¼ ,,
Box	2½ ,,	2¼ ,,
Josephine	2½ ,,	2¼ ,,
White Doyenne	2¾ ,,	2½ ,,
Winter Nelis	2½ ,,	2¼ ,,
Superfine	2¾ ,,	2½ ,,
Forelle	2½ ,,	—
Fertility	2½ ,,	—
Tongre	2½ ,,	—
Durandeau	2½ ,,	—
Le Comte	2½ ,,	—

The varieties known as December and Jargonelle will not receive the Government brand.

Keiffer, Le Comte, Cape Kalabas, Safraan, Winkfield, Clairgeau, Souvenir du Congres must be marked as "stewing."

Peaches.

	Grades.	
	"Extra Selected."	"Selected."
Early Rivers	2⅝ inches.	2¼ inches.
All other early varieties, *i.e.*, varieties, ripening in December	2⅜ ,,	2⅛ ,,
All later varieties	2½ ,,	2¼ ,,

Yellow-fleshed varieties, all varieties of Clingstone and Gladstone will not receive the Government brand.

Nectarines.

	Grades.	
	"Extra Selected."	"Selected."
All varieties	2⅛ inches.	2 inches.

Clingstone varieties will not receive the Government brand.

Apricots.

	Grades.	
	"Extra Selected."	"Selected."
All varieties	2⅜ inches.	2 inches.

Early varieties will not receive the Government brand.

Japanese Plums.

	Grades.	
	"Extra Selected."	"Selected."
Kelsey	2½ inches.	2 inches.
Simoni	2½ "	2⅛ "
Wickson	2⅜ "	2 "
Apple	2⅛ "	1⅞ "
Satsuma	2⅛ "	1⅞ "
Ogon	2⅛ "	1⅞ "
Shiro	2⅛ "	1⅞ "
Chalcot	2¼ "	2 "

Burbanks and Botans will not receive the Government brand

Domestic Plums.

	Grades.	
	"Extra Selected."	"Selected."
Pond's	1½ inches.	
Coe's Golden Drop	1½ "	–
All other varieties	1¼ "	

No "selected" grade domestic plums will receive the Government brand.

Grapes.

No standard sizes have been fixed at present, and all varieties receive the Government brand provided the fruit is in good condition, the bunches and berries are of a satisfactory size and the bunches have been properly trimmed and cleaned. The division into two grades, *viz.*: "Extra Selected" and "Selected" will not apply in the case of grapes. The net weight of fruit, with allowance of 20 per cent. for shrinkage, in addition to variety, should be marked on the end of each case.

13. In the case of any variety of fruit not specified in the above list, it will be left to the discretion of the Inspector to decide whether such fruit shall receive the Government brand.

Note.—These conditions must be strictly complied with by shippers.

D. Hutcheon,
Director of Agriculture.

January 7th, 1907.

GAME SEASONS, 1907.

In view of the near approach of the Shooting Season, the following schedules shewing the General and Special Class Seasons for Game in the respective districts of the Colony at the present date are published for the information and guidance of all concerned.

Agricultural Department, Cape Town, January, 1907.

GENERAL CLOSE OR FENCE SEASON.

Close or Fence Season.	Division.			
I. FROM 1st JULY to LAST DAY OF FEBRUARY	Bredasdorp †Caledon Cape Clanwilliam Ladismith	Laingsburg Malmesbury Montagu Mossel Bay Namaqualand	Oudtshoorn Paarl Piquetberg Riversdale Robertson	Stellenbosch Swellendam Tulbagh Van Rhynsdorp Worcester
II. FROM 1st AUGUST to LAST DAY OF FEBUARY	Aberdeen Albert Aliwal North Barkly East Beaufort West Britstown Calvinia Carnarvon Cathcart Ceres Colesberg	Cradock East London Fraserburg George Glen Grey Graaff-Reinet Hanover Herschel Hope Town *Humansdorp (Birds) Jansenville	Kenhardt King William's Town Knysna *Komgha (Birds) Middelburg Molteno Murraysburg Peddie Philipstown Prieska Prince Albert	Queenstown Richmond Steynsburg Stutterheim Sutherland Tarka Uniondale Victoria West Willowmore Wodehouse
III. FROM 1st SEPTEMBER to LAST DAY OF FEBRUARY	Albany Alexandria Bathurst Bedford	Fort Beaufort Humansdorp (Antelopes) Komgha (Antelopes)	Port Elizabeth Somerset East Steytlerville Stockenstrom	Uitenhage Victoria East
IV. FROM 16th AUGUST to 31st MARCH	Barkly West Hay	Herbert Kimberley	Gordonia Mafeking	Vryburg
V. FROM 1st SEPTEMBER to 15th APRIL	Griqualand East Territory	Transkei, including Gcalekaland	Tembuland, including Emigrant Tembuland and Bomvanaland	Port St. John's

* In Humansdorp and Komgha Divisions Antelopes have a Special Season from 1st September to end of February.

† Caledon—for the year 1907 the close Season will commence on 1st May.

Summary of General and Special Close Seasons, Special Protections and Exemptions, January 27, 1907.

(Divisions alphabetically arranged according to Groups).

THE KAAL KOP SPREEUW or WATTLED STARLING is protected to 8th June, 1908, and GEMSBOK to 3rd December, 1908, throughout the Colony, excluding Griqualand East, Tembuland and Transkei and Pondoland.

NOTE.—To kill Wild Ostriches on unoccupied Crown Lands, a Licence Fee of £20 for the season must be taken through the Resident Magistrate of the Division in which the birds are to be hunted. Further, an export duty of a £100 is levied on each Ostrich (wild or tame) exported to other countries, and £5 on every Egg; except to any State or Country that imposes a duty of not less than these respective amounts.

The Crowned and Black-winged Lapwing,—both commonly known as Kievietjes, are protected to 1st July, 1909, throughout the whole Colony.

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game exempted from Protection.
GROUP I.				
Bredasdorp ..	July to end February.	Wild Duck, Sept. 1 to Nov. 30.	Namaqua Partridges to August 20, 1909	
	,,	Wild Geese do.	All kinds of Antelopes to end February, 1907,	
Caledon ..	May to end February	Coot do.		
Cape ..	July to end February	Cape Turtle Dove, June 1 to Dec. 31 Large Yellow Seedeater, June 1 to Nov. 30 .. .. .. Long-tailed Sugarbird, June 1 to Nov 30 .. .. .. Malachite Sunbird June 1 to Nov. 30 Double-collared Sunbird, June 1 to Nov. 30 Orange-breasted Sunbird. June 1 to Nov. 30. Grysbuck in Constantia. Dec. 1 to June 30.	Certain small birds, to December 11, 1907. Fiscal Shrike Constantia, to December 11, 1907. Game on Durbanville Commonage to August 21, 1907.	

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game exempted from Protection.
GROUP 1.—*con.*				
Clanwilliam ..	July to end February.	Pauuw, December 1 to June 30 ..		
Ladismith ..	do.	..	Koodoo, to end of February, 1908.	Hares to November 17, 1907.
Laingsburg ..	do.	..	Rhebok, to 30th June, 1908.	
Malmesbury ..	do.	Paauw, December 1 to June 30 ..	..	
Mossel Bay ..	do.	..	Game on Mossel Bay Commonage to August 6, 1908. All Birds on Mossel Bay Commonage to August 8, 1908. Koodoos, to September 2, 1909.	
Namaqualand..	do.	Paauw, December 1 to May 31 Wild Ostriches, June 1 to Nov. 30. Gemsbok, December 1 to May 31 ..		Paauw, to March 21, 1907. Namaqua Partridge, to March 21, 1907. Hares to October 27, 1907.
Oudtshoorn ..	do.	..	Wild Duck, Blue Hawk, Secretary Bird, and certain small birds to February 5, 1908. All Game to August 4, 1907.	
Paarl ..	do.	..	..	
Piquetberg ..	do.	Paauw, December 1 to June 30 ..	Rhebok and Klipbok, to Aug. 5, 1909.	
Riversdale ..	do.	..	Koodoo, to end February, 1908. Bushbok and Rhebok to Aug. 28, 1909. All Game on Riversdale Commonage, to February 11, 1909.	
Robertson ..	do.	..	..	
Stellenbosch ..	do	..	Guinea Fowl to April 9, 1908.	
Swellendam ..	do.	Grysbok, January 1 to June 30 ..	Game on Heidelberg Commonage to June 30, 1907.	Hares to January 7, 1909.
Tulbagh ..	do.	..	..	
Van Rhynsdorp	do.	Wild Ostriches, 360 days in each year, commencing on July 1 Paauw, December 1 to June 30	Secretary Bird to June 2, 1907. Blaauw Valk to June 2, 1907.	
Worcester ..	do.	Paauw, December 1 to June 30	..	

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game Exempted from Protection.
GROUP 2.				
Aberdeen ..	August 1 to end Feb.	Gom-Paauw and Vlak-Paauw, Aug. 1 to November 30. Guinea Fowl, October 1 to March 31		
Albert ..	do.	..	Rhebok, Steenbok and Klipspringers to 18th May, 1909.	
Aliwal North ..	do.	..		
Barkly East ..	do.	..	..	
Beaufort West..	do	Wild Ostriches, June 1 to 360th day after.	Game and Birds of all kinds in Beaufort West Municipality to Aug. 28, 1908	
Britstown ..	do.	Wild Ostriches, June 1 to Nov. 30.	Springbok, Rhebok, Steenbok and Korhaan, to July 31, 1908	
Calvinia ..	do.	Paauw, December 1 to June 30 .. Wild Ostriches, June 1 to 30th day after		
Carnarvon ..	do.	Paauw, December 1 to May 31 .. Namaqua Partridge, Dec. 1 to May 31		
Cathcart ..	do.	Partridges, August 1 to March 31 ..	..	Hares to Dec. 30, 1909
Ceres ..	do.	Paauw, December 1 to June 30.	Doves, except Bushdoves, in Ceres Municipality to December 11, 1907 Game, including Rock Rabbits, in Ceres Municipality to December 8, 1907.	
Colesberg ..	do.	..	Game on Colesberg Commonage to January 15, 1908. All kinds of Antelopes, except Springbuck, to end of February, 1910.	
Cradock ..	do.	..	Small birds in Cradock Municipality to August 7, 1907.	
East London ..	do	..	All kinds of Game on Commonage adjoining Van der Kemp's Location, to July 23, 1908. Bushbuck Ewes. to November 13, 1908	
Fraserburg ..	do.	Paauw, February 1 to July 31. Namaqua Partridge, Feb. 1 to July 31	Duiker to August 4, 1907, Steenbok do. Hares do.	

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game Exempted from Protection.
GROUP 2.—*con.*				
George .	August 1 to end February	Paauw, August 1 to January 31.	In the portions of the Field-cornetcies of George and Outeniqualand, bounded on the East by the Zwarte River, on the West by the Malagas and Gwyang Rivers, on the North by the Oteniqua Mountains, and on the South by the sea. All kinds of game, to March 18, 1908. Rooi and Vaal Rhebok, to Sept. 2, 1909	
Glen Grey ..	do.	..	..	
Graaff-Reinet ..	do.	Guinea Fowl, October 1 to January 31	..	
Hanover ..	do.	Springbuck, June 1 to November 30	All kinds of Antelopes, with exception of Springbuck, to January 28, 1909.	
Herschel ..	do.	..	..	
Hope Town ..	do.	Wild Ostriches, 1st June to May 30..	Game on Hope Town Commonage, with exception of Partridges, to December 31, 1907.	
Humansdorp .. (*Birds*)	do.	Antelopes, Sept. 1 to end February Partridges, July 1 to January 31	..	Paauw Dikkop Hares } to Feb. 25, 1907.
Jansenville ..	do.	..	..	
Kenhardt ..	do.	..	..	
King William's Town ..	do.	..	..	
Knysna ..	do.	..	..	Hares to Nov. 19, 1908
Komgha .. (*Birds*)	do.	Antelopes, Sept. 1 to end February..	Bushbuck Ewes, to end Feb., 1907.	
Middelburg ..	do.	..	..	
Molteno ..	do.	..	Rhebok to June 24, 1909 ..	
Murraysburg ..	do.	..	Game on Murraysburg Commonage, March 2, 1907.	
Peddie ..	do.	..	..	

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game Exempted from Protection.
GROUP 2—*con.*				
Philipstown .	August 1 to end Feb	Springbuck, December 1 to Jan 31	All Game on Petrusville Commonage to May 1, 1908 Steenbok, Rhebok, and Springbuck, to August 21, 1907	
Prieska ..	do	Rhebok, 1st August to January 31.. Steenbok do Duiker do Hares do	Wild Ostriches and Korhaans to September 27, 1909	
Prince Albert .	do	..	All kinds of Game to 28 August, 1909 Wild Ostriches to January 19, 1908	
Queenstown ..	do	Paauw, December 1 to June 30 All kind of Antelopes from 1st July to the last day of February	Antelopes, Guinea Fowl, Partridges, Dikkop, Hares — On Queenstown Commonage, to May 31, 1907 Birds of every description in the Queenstown Municipality, to August 31, 1909	
Richmond ..	do	..	Wild Ostriches, to January 31, 1907	
Steynsburg ..	do	..	Game on Steynsburg Commonage, to August 17, 1908	Hares to Jan. 6, 1910
Stutterheim ..	do	..	Bushbuck Ewes, to end of February, 1909	Hares (Kolhaas) to to Jan., 1910
Sutherland ..	do	..	..	Paauw to Nov. 17, 1907
Tarka .	do	..	All kinds of Antelopes to 31 March, 1908	Paauw to Jan 19, 1908
Uniondale ..	do	..	..	Hares to Feb 4, 1907
Victoria West..	do	..	Municipality — Victoria West, all Game to April 9, 1907	
Willowmore ..	do	..	..	

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game Exempted from Protection.
Group 2— *con*				
Wodehouse ..	August 1 to end Feb	..	Springbok, Rhebok, and Korhaan, to September 29, 1908	
Group 3.				
Albany ..	September 1 to end Feb	Partridges, Pheasants } August 1 to end Feb	Plovers, Grebes, Owls and small birds in Grahamstown Municipality, to February 7, 1907 Secretary Birds, Herons, Hawks, Kites, Owls and other birds, to November 16, 1907 Paauw, Oribe, Rhebok, Bushbuck Ewes } to Oct 23, 1907 Koodoo Cows, to August 17, 1908	Hares, to Jan 7, 1909
Alexandria ..		..	Bushbuck Ewes, to Aug 5, 1909 Duikers, to May 4, 1909	do
Bathurst ..	do	..	Bushbuck Ewes and Oribe, to May 17, 1908 Birds on Kowie River Banks, to September 30, 1909 Game in Port Alfred Municipality. to Nov 4, 1909	Hares to July 15, 1909
Bedford ..	do	..	Bushbuck Ewes, to end Feb 1910	Guinea Fowl, Hares, Paauw } to Jan 19 1908
Fort Beaufort ..	do	..	Bushbuck Ewes, to November 19, 1908	
Humansdorp .. *(Antelopes*	do	Partridges, July 1 to Janu ..	..	Paauw, Dikkop, Hares } to Feb 25, 1907

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game Exempted from Protection.
GROUP 3—*con.*				
Komgha (*Antelopes*)	September 1 to end Feb	..	Bushbuck Ewes, to end Feb, 1907	
Port Elizabeth .	do	Paauw, September 1 to end February Dikkop, do Partridges, July 1 to end February Wild Duck, Sept 1 to December 31 Cape Turtle Doves, June 1 to Dec 31		
Somerset East ..	do	Bushbuck Steenbok Duiker Klipspringer } August 1 to end February	Bushbuck Ewes on Somerset East Commonage, to April 11, 1907 Sacred Ibis, to December 30, 1910	
Steytlerville ..	do	..	..	Guinea Fowl to Jan. 1910
Stockenstrom .	do	..		
Uitenhage ..	do	Partridges, June 1 to end February Paauw Dikkop Korhaan } September 1 to end Feb Wild Duck, September 1 to end Feb	Small birds in Uitenhage Municipality, to June 14, 1907	
Victoria East ..	do	..		
GROUP 4.				
Barkly West .	August 16 to March 31	Wild Ostriches, June 1 to May 30		
Hay ..	do	do do		
Herbert ..	do	Wild Ostriches, July 1 to June 29 Springbuck, September 1 to Jan 31	Koodoo Hartebeest } to December 10, 1908*	

* Except on the farms Doornlaagte, Wildehondepan, Vaalboschpan, and Scholtzfontein North

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game Exempted from Protection.
GROUP 4—*con.*				
Kimberley ..	August 16 to March 31	Wild Ostriches, June 1 to May 30	All kinds of Plovers, to Aug 17, 1903 Certain small birds to Jan., 1910	
Gordonia	do	..		
Mafeking ..	do	..	Game on Mafeking Commonage, to May 20, 1908 Wild Ostriches, to April 9, 1908	Hares to Nov 20, 1909
Vryburg ..	do	Wild Ostriches, Sept 1 to end Feb	Wild Ostriches, to January 19, 1908 Koodoo, to March 31, 1909	
GROUP 5.				
Griqualand East, Territory of ..	September 1 to April 1	..	Bushbuck Ewes, Klipspringers, Rooi Rhebok, Oribe, Rietbok to June 14, 1908 District of Mount Ayliff. All kinds of game except Bushbuck Rams and Partridges to June 14, 1908	
Tembuland, including Emigrant Tembuland and Bomvanaland ..	do	In Elliot District for Partridges August 16 to April 15 Wild Duck, Wild Goose, Snipe Sept 1 to April 15	All game in Mqanduli District, to October 23, 1908 Antelopes in Elliot District, to May 4, 1909 Game on Engcobo Commonage, to February 25, 1907 Bushbuck Ewes in District Elliotdale, to November 12, 1908 Game on Cala Commonage, to Apri 21, 1907	

Division.	General Close Season.	Special Close Season.	Animals or Birds Specially Protected.	Game Exempted from Protection.
GROUP 5—*cont.*				
Transkei, including G'caleka-land ..	September 1 to April 15	Partridges, August 16 to April 15 Wild Duck, Wild Goose, Snipe, Sept. 1 to April 15	Bushbuck Ewes in Willowvale District, to November 12, 1908. Game in Kentani District, to December 1, 1907. Idutywa. All game to June 29, 1908. Butterworth Commonage, Ibeka Reserve, Native Locations (Butterworth District): All game to May, 1908.	
The Territories of Transkei, G'caleka-land and Tembuland, including Emigrant Tembuland and Bomvanaland ..	d	do.	Bushbuck Ewes, to Sept. 29, 1908. Throughout the District of Butterworth (with the exception of Butterworth Native Locations and Commonage, where all game is protected by Proclamation No. 135 of 1905, to May 1, 1908), Tsomo, Nqamakwe, Umtata, Mqanduli, Engcobo (with the exception of Engcobo Commonage, where all game is protected by Proclamation No. 66 of 1904, to February 25, 1907), St. Marks and Xalanga.	
Port St. John's	do.	do.	All game to May 4, 1909.	

"Royal" or Big Game.

A Special Permit to shoot any of the varieties of Big Game mentioned hereunder must be obtained from the Government in addition to the Ordinary Game Licence. Application should be made to the Director of Agriculture through the Resident Magistrate of the Division in which the game is to be hunted.

Elephant.—Alexandria, Uitenhage, George, Knysna.

> NOTE.—As Elephants only exist in limited numbers in these Divisions, special permits are only granted in very exceptional cases. Landed proprietors, or persons authorized by them, are, however, entitled to kill Elephants on their own property.

Eland.—Only a few domesticated Elands are to be found in the Colony—at Groot Schuur, Rondebosch; and in Graaff-Reinet Division. No permits are granted to shoot these animals.
Hippopotamus.—Not to be found in the Colony.
Zebra.—Cradock, George, Prince Albert, Uniondale, Oudtshoorn, Somerset East.

> NOTE.—Only a few Troops of Zebras exist in the above Districts, and the destruction of these animals is consequently prohibited; no permits are now issued.

Buffalo.—Albany, Alexandria, Bathurst, Uitenhage.
Bontebok.—Bredasdorp, Swellendam.
Blesbok.—Swellendam, Prieska, Steynsburg.
Gemsbok.—Barkly West, Gordonia, Hay, Mafeking, Kenhardt, Namaqualand, Prieska. These antelopes are at present specially protected.
Haartebeest.—Barkly West, Gordonia, Hay, Kimberley, Mafeking, Vryburg, Herbert.
Koodoo.—Albany, Fort Beaufort, Uitenhage, Victoria East, Jansenville, Kenhardt, Prieska, Prince Albert, Steytlerville, Willowmore, Barkly West, Gordonia, Hay, Kimberley, Mafeking, Vryburg, Herbert, Ladismith, Oudtshoorn, Riversdale.
Rietbok.—Kimberley, Komgha, Griqualand East.
Wildebeest.—Gordonia, Hay, Mafeking, Vryburg.

Birds Specially Included as Game.

Quail.—On Robben Island.
Namaqua Partridge.—Barkly West, Carnarvon, Fraserburg, Hay, Herbert, Hope Town, Kimberley, Namaqualand, Victoria West, Vryburg.
Wild Duck.—George, Port Elizabeth, Uitenhage, Barkly East, Elliot (Tembuland).
Wild Goose.—Barkly East, George, Elliot District (Tembuland).
Snipe.—Elliot District (Tembuland).
Coot.—George, Barkly East.

Game Reserve Declared under Act No. 33 of 1899.

Division of Namaqualand.—Proclamation, No. 241 of the 14th Aug., 1903.—From the south-eastern Beacon of the Farm "Koeries and Taukheis," called "N. E. Sector Berg," as shewn on plan No. 5 O.P., filed in the Surveyor-General's Office, thence along the boundaries of the following farms, so as to exclude them from this area:—"Koeries and Taukheis," "Taaibosch Mond," "Koams and Zout Vlei," "Naghas," "Oograbies," "Zuurwater," "Aggeneys," "Hartebeest Vlei" and "Banken," to its south-western Beacon; then in a straight line to the Beacon first named (about 120,226 morgen).

Forest Reserves.

Permits are issued to a limited extent for shooting in the Crown Forests: information as to conditions of Permit and Scale of Charges may be obtained on application to the Conservators at Cape Town, King William's Town and Knysna.

In the Forest Reserves of the Transkei, Tembuland, East Griqualand and Pondoland no person is allowed to hunt, catch, pursue or shoot at game, or trespass with dog or gun, without a written permit from the Conservator of Forests, Umtata, or other duly qualified Forest Officer.

Trout.

In pursuance of the efforts made by the Government for some time past for the acclimatisation of these fish in South Africa, Trout have from time to time been placed in several Rivers and Vleys in the Western Districts and in the Eastern Province.

The undermentioned waters have, so far, been declared open for Fly-fishing:—

The Eerste, Lourens, Berg, Breede, Hex, Palmiet Rivers, and River Zonder End, and their tributaries, Princess Vlei, Ronde Vlei and Seacow Vlei in the Cape Division, from 1st October to 15th January, both days inclusive.

The Keiskama, Izeli, Buffalo, Kubusi, and Wildebeeste or Inxu Rivers, and their tributaries, from 1st October to 31st March, both days inclusive.

The dates mentioned above are, however, liable to alterations, and Sportsmen would do well to satisfy themselves as to the correct dates when taking out their Permits.

The following conditions are at present in force

1. (*a*) That no person shall fish for, capture, pursue or destroy Trout of any variety, without first having registered his name with, and obtained a permit from the Resident Magistrate of any of the following Districts, viz.:—Cape Town, Paarl, Stellenbosch, Caledon, Wellington, Tulbagh, Piquetberg, Worcester, Port Elizabeth, East London, King William's Town, Grahamstown and Maclear.

   (*b*) That fishing shall be with Rod and Line only, and that Artificial Fly be used as a lure: no phantom or other minnows or spoons, no dead or live baits, and no nets or other mode of capture allowed, but this shall not be held to exclude the use of a legitimate Landing Net or Gaff for landing the fish caught.

   (*c*) That if any Trout less than Twelve Inches in length be caught, it be forthwith returned to the water from which it was taken, with as little delay and as little injury as possible, and that the number of Trout of Twelve Inches in length and over which may be caught by any one person in one day shall not exceed six.

   (*d*) That the consent of the owner or owners on whose ground it is proposed to fish be first obtained.

   (*e*) That the permit issued be produced for inspection when demanded by any member of the Police Force, Forest Ranger or Officer, or other Government Official, or by the owner of the property on which the holder of the permit is fishing.

   (*f*) That the permit be not transferable.

2. Riparian Owners shall not require to obtain a permit to fish the open waters on their own property during the Fishing Season, but such fishing shall be subject to the conditions mentioned in Regulation No. 1 preceding.

3. Any person or persons contravening any of the foregoing Regulations shall be liable, on conviction, to a Fine not exceeding Twenty Pounds Sterling (£20) for each Offence, and in default of payment thereof, to imprisonment, with or without hard labour, for a period not exceeding Three Months.

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town. Members of Farmers' and Fruit Growers' Associations applying for same through the Secretaries of these Associations are supplied free of charge.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V of *Agricultural Journal.*

Artificial Grasses and Fodder for Stock; Ensilage; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry; Locusts and their Destruction; Possible New Industries for Cape Farmers; Stock Farming; Dairying; Fruit Culture (6d.)

Agriculture.

Wheat Production in Australia (1s. 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s. 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A. W. Heywood; *Brak Land in Relation to Irrigation and Drainage (1d.); The Velvet Bean (1d.); Potato Disease (1d.); Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d.); Sundry Forage Crops for trial in Cape Colony (1d); Poultry in South Africa: Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.); Tobacco Culture by P. Bornemisza (1d.); The Cultivation of Tobacco in the Colony by K. Schenck (3d.); Tobacco Wilt in Kat River Valley (1d.); *The Process and Appliances for the Flue Curing of Tobacco. (3d.)

Dairying.

Dairy Breeds by A. C. Macdonald (9d.); *Dairy Industry in Great Britain by A. C. Macdonald (6d.); *Dairy Industry in Denmark (2d.); Ready Reckoner for Cream Testing (1s.); †Dairy and its products by D. Hutcheon (2d.); *Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.); Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d.); *Codling Moth (1d.); Fruit Fly (1d.); Fumigation Supplies (1d.); Insect Friends and Foes (1d.); Methods of Locust Destruction (1d.); *Peach Yellows (1d); Pear Slug, Paris Green (1d.); Remedy for Mestwurmen (1d.) *Spray Calendar (1d.); *Spray Pump Notes (1d.); Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d.); Tree Fumigation in California (1d.); Winter Spraying (1d.); Wattle Bag Worm (1d.); Bordeaux Mixture (1d.); Deaths Head Moth Superstition (1d.); Fumigation under Box Covers (1d.); The House Fly (1d.); New Oak Tree Post (1d.): Nursery Inspection and Quarantine Bill (1d.); Oil Water Pumps (1d.); The Plague of Ticks (1d); Potato Tuber Moth (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d.); Gall Worms in the Roots of Plants (1d.); The Fruit Fly,* (with coloured plates) (3d.); Another Introduced Scale Pest (1d.); Washes for Red Scale (1d.); Fruit Fly: Peach Fly (1d.); Lime-Sulphur-Salt Wash for Scale Insect (1d.); The Fruit Moth (1d.); Fusicladium of the Apple and Pear (1d.); Mealie Stalk Borer (3d.)—*coloured plate*: Cleaning up Nursery (1d.); Natural Enemies of the Fruit Fly: Report on Investigations in Brazil (1d.); Locust Birds and Locust Poison (1d.); The Brazil Fruit Fly Parasites (1d.); Cyanide Gas Remedy for Scale Insects (3d.); Arsenate of Lead (1d.)

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d.); †Elementary Principles of Sylviculture or Woodcraft (1d). National Forests (1d.); Indigenous Timbers of the Cape (1d.); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.); Tree Planting for Farmers (1d.)

NOTE.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d.); Portable Floating Hatching Box for Trout Ova (1d.) The Protection of Trout (1d.); The Ocean and its Resources (1d.)

Horticulture

Fruit Culture in the Gamtoos River Valley (1d.); *Marketing of Fruit (1d.), Manual of Practical Orchard Work at the Cape (6d.); The Olive at the Cape (2d); Tomatoes and Fruit for Export (1d.); Citrus Culture in Cape Colony: Report of the Citrus Commission (1d.); *Fruit from Orchard to Buyer (1d); Netting for Fruit Trees (1d.); Fruit Culture in Argentina (1d.); Vegetables for Exhibition (1d.) Chrysanthemum Rust (1d.)

Veterinary and Animal Industry,

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d.); *Heartwater (1d); *Malarial Catarrhal Fever of Sheep (1d.); *Preventive Vaccination against Anthrax and Swine Fever (1d.); Rinderpest: Dr. Koch's Report (1d.); *Inoculation against Rinderpest (1d.); Dr. Kohlstocks Report on Inoculation for Rinderpest (1d.); *Redwater, Texas Fever or Tick Disease (1d.); *Redwater, Anthrax and Quarter Evil (1d.); *Sheep and Wool (1d.); The Eye and its Diseases (1d.): Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.); Tick Heartwater Experiments (1d.); Indigestion and Diarrhœa in Calves (1d.); Persian Sheep and Heartwater (1d); Poisoning of Stock (1d.); Retention of the Fœtal Membrane, or Afterbirth in Cows (1d), Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d.); Tuberculosis and the Use of Tuberculin (1d); African Coast Fever with Description of Dipping Tank (3d.); *Rinderpest in South Africa (3d) by D. Hutcheon; *Fluke or Slak in Liver of Sheep (3d.)—*coloured plate*; *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.); Osteo Porosis (3d.) *coloured plates*; *Glanders (3d)—*coloured plate*; *Animal Castration (1d.); *Preventive Inoculation for Redwater (1d.); *Abortion in Cattle (1d.), Treatment for Worms in Domestic Animals (1d.); *Lungsickness of Cattle, Contagious Pleuro-Pneumonia, or Pleuro-Pneumonia-Bovum-Contagiosa (1d.): *Swine Fever, Hog Cholera or Pig Typhoid (3d.)—*coloured plates*; Castration of Females and Animals other than the Horse (1d.); Poisoning of Horses by *Ornithogalum Thyrsoides* or Chinkerinchee (*coloured plate*) (3d.); Diseases of the Horse and their Treatment (1s.); Horse Sickness by D. Hutcheon (2d); Ticks and African Coast Fever (1d.); Cirrhosis of the Liver in Stock (1d.); Liver Disease among Calves (3d.); The Arsenite of Soda Dipping Mixture (1d.); *Lampas.

Viticulture.

†Reports on Viticulture (3d.); *Reconstitution of Phylloxerised Vineyards (1s.); Report on Failure of Hanepoot Grapes on American Vines (1d), The Making of Wine and its By-Products (6d.); How to Treat Wine Casks (1d.); Failure of Vines (1d.); Manufacture of Dry Wines in Hot Countries (3d.)

Miscellaneous.

Game Seasons (3d.); Land Laws of Cape Colony (1d.): †Monsonia: the Cape Cure for Dysentery (1d.); *Rainfall of South Africa (1d.); Sand Dunes of Gascony (5d.); The Metric System (1d.); South African Stud Book, Constitution, Rules, &c. (1d.); Bars in Ostrich Feathers (1d.); *Information regarding the Mining Laws. (1/-)

NOTE.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

AGRICULTURAL SHOW DATES, 1907.

Aliwal North, on Tuesday and Wednesday, February 12 and 13.

Queenstown, on Wednesday, Thursday and Friday, February 13, 14 and 15.

Malmesbury & Piquetberg, at Malmesbury, on Wed., Feb. 13.

Robertson and Montagu, at Robertson, on Wed., Feb. 13.

Bayville, on Friday, February 15.

Western Province, at Rosebank on Tuesday, Wednesday, and Thursday, February 19, 20, and 21.

Ceres, on Wednesday, February 27.

Riversdale, on Wednesday, February 27.

Caledon, on Thursday, February 28.

King William's Town, on Thursday, February 28 and Friday, March 1.

St. Mark's Agricultural Society, at Cofimvaba, on Friday, March 8.

East London, on Thursday, Friday, and Saturday, March 7, 8, and 9.

Barkly East, Wednesday, March 13. Judging on Tuesday, March 12.

Cathcart, on Wednesday, March 13.

Molteno, on Tuesday, March 19.

Richmond, on Wednesday, March 20.

Glen Grey, at Lady Frere, on Wednesday, March 20.

Humansdorp, on Wednesday, March 20.

Bloemfontein, on Tuesday, Wednesday, and Thursday, March 19, 20 and 21.

Oudtshoorn, on Wednesday, Thursday, and Friday, March 20, 21, and 22.

Umtata, on Thursday and Friday, March 21 and 22.

Mafeking, on Wednesday, March 26.

Midland Agricultural Society (Graaff-Reinet), on Tuesday and Wednesday, March 26 and 27.

Wodehouse Agricultural Society, Dordrecht, on Wednesday, March 27.

Albert Agricultural Society, at Burghersdorp, on Wednesday and Thursday, March 27 and 28.

Bathurst, Wednesday and Thursday, March 27 and 28.

Butterworth Farmers' and Traders' Association Show, on Thursday, March 28.

Cradock, on Tuesday and Wednesday, April 2 and 3.

Kokstad, on Tuesday and Wednesday, April 2 and 3.

Albany Agricultural Society, at Grahamstown, on Thursday and Friday, April 4 and 5.

Cape Flats Farmers' Show, Wednesday, April 10.

Elliot, on Wednesday, April 10.

Port Elizabeth, on Wednesday, Thursday, and Friday, April 10, 11, and 12.

APPLICATIONS FOR AGRICULTURAL EMPLOYMENT.

Louis A. Lauder, 2, Rowlands Cottages, Klipper Road, Newlands, Cape.—Employment wanted in dairying or general farm work. Understands treatment of cattle and horses, also of livestock generally, together with land cultivation. References good. Age 41. Married; two children.

J. G. D. Rex, Barroe Station, Steytlerville: Age 59. Married. One child Twenty years experience in Sheep and Goat farming. Understands livestock generally. Desires management of Farm or Dairy, or other farm work. Wife understands management of poultry.

Wanted position on a good stock farm as assistant or under-manager; applicant has had year-and-a-half's experience on Eastern Province stock farm, would be satisfied with board and small salary, or grazing for stock. Satisfactory testimonials, age 26, unmarried.—Reply to C. D. P.O. Box 61, Grahamstown.

Charles J. Veitch, Goudfontein, P.O. Roodehoogte, Middelburg: Young apprentice wanted for general farm work. Mixed farming, agricultural and live stock, but principally small stock. References as to respectability are requisite, as apprentice will live with family. Must be prepared to work. No salary first few months, after that by mutual arrangement.

E. J. G., of Balfour, has a knowledge of tobacco culture, and would like employment on a farm where that crop has never been tried. Would be pleased to learn something of stock. Good references.

' Manager," care of Mr. Attorney Trollip, Capetown, seeks employment as estate or fruit farm Manager. Is thoroughly conversant with fruit tree and vine culture, the grading and packing of fruit for market, the planning, planting and general management of estate. Highest references.

Lady, trained at the Dairy College, Kilmarnock, and holding the National Dairy Diploma, seeks employment. Understands shorthand and typewriting. Has had business experience and is very capable. Would accept work as accountant or secretary at a dairy, but prefers dairying. Good references. Apply the Secretary, South African Colonisation Society, Munsted Rough, Godalming, Surrey, England.

Young Englishman, married (aged 29), well educated, with six years' residence in South Africa, seeks employment as farm-bailiff, working manager, or assistant on a farm, with a view to gaining experience of South African farming (stock preferred). Wife musical, and qualified and willing to teach young children. Agreement if desired. Remuneration small. Highest references. Address: Lawson, "Rockstead,' Bellwood Estate, Sea Point, Capetown.

THE PRODUCE MARKET.

CAPE TOWN.

Mr. R. Muller reports for the month ending January 31st:—

Ostrich Feathers.—The market has been well supplied with good average quality. There is a good enquiry for Whites, Femina, Spadonas and Tails, for which full rates were obtained. Short goods, particularly Blacks, are somewhat weaker.

	£	s.	d.	£	s.	d.
Super Primes	11	0	0	35	0	0
Firsts, Ordinary to Super	8	0	0	12	0	0
Seconds	6	0	0	8	0	0
Thirds	3	10	0	4	10	0
Femina, Super	9	10	0	14	0	0
Femina, Seconds to Firsts	4	10	0	8	0	0
Byocks (fancy)	5	10	0	8	0	0
Long Blacks..	3	10	0	7	10	0
Medium Blacks.. ..	2	0	0	3	0	0
Short to Medium ..	0	10	0	2	10	0

	£	s.	d.	£	s.	d.
Floss	0	5	0	1	10	0
Long Drabs..	2	10	0	4	0	0
Medium Drabs	1	5	0	2	0	0
Short to Medium ..	0	10	0	1	15	0
Floss	0	2	6	1	10	0
White Tails..	1	15	0	3	10	0
Coloured Tails	0	10	0	2	10	0
Chicks	0	1	0	0	2	0
Spadonas..	2	10	0	4	10	0
Inferior Black and Drabs, short to long..	0	0	6	1	10	0

Wool.—During the past month a large quantity has been offered. Good quality meets with continued good demand. A clip of superior light Roggeveld wool realised 9¼d. per lb., which may be considered an exceptionally good price. Snow-whites are in good demand, one parcel of Extra Super fetched 1s. 9½d. per lb. The London wool sales opened on the 15th January with active competition, and full prices were obtained. All classes of scoured wools advanced 5 per cent. It is satisfactory to be able to report that this season's wools so far are an improvement on those of last season.

	s.	d.	s.	d.
Super long Grass Veld	0	8	0	10
Do. Karoo	0	6¾	0	8
Medium..	0	5	0	6
Short and Inferior ..	0	4	0	4½
Wool for washing	0	4½	0	6

	s.	d.	s.	d.
Snow-white, Super to Extra	1	7	1	9½
Do. Ordinary	1	1	1	6½
Fleece, washed	0	0	0	10

Mohair.—There is more enquiry now for Summer Firsts, but there have been few transactions, as sellers hope to obtain an advance on the present prices. I quote for good Firsts 14d. to 14½d.; for mixed lots, 11d. to 11¾d.; Super Summer Kids, 18d. to 19d.; Ordinary, 16d. to 17½d.

	s.	d.	s.	d.
Firsts, Summer	1	1½	1	2½
Kids	1	4	1	7
Seconds	0	6½	0	10

	s.	d.	s.	d.
Winter	0	10½	0	11½
Do. Kids	1	1	1	2½

Hides and Skins.—There is a continued good demand for all classes. Light goat skins are in strong request at the last London sales, while medium weights were neglected. Merino skins are unchanged.

PORT ELIZABETH.

Messrs. J. Daverin & Co. report under date February 1st:—

Ostrich Feathers.—A full three days' sale was again held this week, when a fair average assortment was offered to good competition. Prices on the whole ruled unchanged for all descriptions, and the market closed firm at last week's rates. The total quantity sold amounted to £11,655 13s. 7d., and weighed 4,581 lbs. 7¾ ozs. A fair amount of business was also done out of hand at current

R. MÜLLER, 77, STRAND STREET, CAPE TOWN,

Pays HIGHEST prices for:—

WOOL, OSTRICH FEATHERS,
MOHAIR, SKINS, HIDES,
and other PRODUCE.

R. MÜLLER, Cape Town,

Supplies **Best MERINO RAMS** and **EWES.**

Bankers: African Banking Corporation.

P.O. Box No. 133. Telegrams: RELLUM, Cape Town. Telephone No. 180.

R. MÜLLER,

77, Strand Street, CAPE TOWN.

Wall Papers! Paints!

The most artistic selection in South Africa to select from. Wall Papers, Lincrusta Walton, Anaglypta, Papier Mache Cornices, Centres, etc.

White Lead, Paints, Oils, Varnishes, etc.

All goods warranted best quality. Lowest market prices.

Sole Agents for DURESCO the famous Washable Distemper, better than Oil Paint on new plaster, and specially suitable for Farm Buildings. Will stand storm or sunshine.

Samples and Price Lists on Application.

SMYTH & CRAWFORD,

35, Wale Street, CAPE TOWN.

One Door above Loop Street.

prices. The London sales open on Monday, the 4th inst., and our London correspondents write as follows *re* the prospects:—"The selection at the ensuing sale will be better than last time, and at present there seems no reason, in spite of the large quantities available, to anticipate any important change in values."

	£	s.	d.	£	s.	d.
Primes: Extra super	Special Prices.					
Good to Super..	12	0	0	16	0	0
Whites: Firsts	9	0	0	12	0	0
Seconds	6	0	0	9	10	0
Thirds	3	0	0	5	10	0
Feminas:						
Super	9	0	0	14	0	0
Firsts	6	10	0	9	10	0
Seconds	5	0	0	6	10	0
Thirds	2	10	0	3	0	0
Greys	4	10	0	7	0	0
Fancy	5	10	0	8	10	0
Tails: White	1	10	0	3	10	0
Light	1	5	0	2	10	0
Coloured & Dark	0	5	0	1	2	6

	£	s.	d.	£	s.	d.
Blacks: Long	3	10	0	5	0	0
Medium	1	10	0	2	15	0
Short	0	10	0	1	0	0
Wirey	0	1	0	0	1	0
Floss	0	6	0	1	10	0
Drabs: Long	1	15	0	3	5	0
Medium	0	12	6	1	0	0
Short	0	2	6	0	6	0
Wirey	0	0	6	0	1	0
Floss	0	6	0	1	10	0
Spadonas: Light ..	1	5	0	4	10	0
Dark	0	10	0	1	15	0
Chicks..	0	0	3	0	1	6

Wool.—There is no alteration to report in this market locally, and our cable received two days ago says:—"Wool market closed strong, snow-whites ½d. dearer." The demand here continues steady, a fair quantity changed hands in the open market during the week (our sales totalled about 1,300 bales), and for well-grown, well-conditioned wools good prices were paid. We sold several clips from the O.R.C. procuring as high as 8d. per lb. Among the clips for which we secured this price were those of Mr. D. J. Hodgman, and Mr. P. J. Lategan, of Helvetia, Kroonstad. These clips were carefully got up, and buyers appreciated the condition of the wool, paying accordingly about 1d. per lb. more than the general run of wool from the Kroonstad District. The bulk of the wool now held here is of the heavy, wasty description which buyers are not keen on, and which can only be moved by accepting low prices. The market generally is in a healthy state, and the immediate future looks bright. On yesterday's public market all light wools sold readily at full prices, but the bulk of the offerings consisted of heavy and wasty lots, which were neglected and mostly withdrawn at low bids.

	d.	d.
Snow-white, Extra Superior	19½	21
Do. Superior..	18	19½
Do. Good to Superior..	16½	17½
Do. Inferior Faulty ..	16	16½
Grease, Super long, well-conditioned, Grassveld grown (special clips).	9½	10
Grease, Super Long, well-conditioned, Grassveld grown..	8	9
Grease, Super Long, well-conditioned, Karoo grown (special clips)	7½	8
Grease, Super Long, well-conditioned, Karoo grown..	6½	7
Grease, Super Long, well-conditioned, Mixed Veld	5¾	7
Grease, Light, faultless, medium, Grasveld grown	6½	7¾
Grease, Light, faultless, medium, Karoo grown	5¾	6¼
Grease, Light, faultless, short, Karoo grown ..	5½	5¾

	d.	d.
Grease, Short, faulty and wasty	5	5¼
Grease, Coarse and Coloured	4¼	4¼
Scoured, Coarse and Coloured	6½	12
Basuto Grease, short.. ..	6¼	6⅝
O. R. C. Grassveld Grease, long and well-conditioned (special clips)	7½	8
O. R. C. Grassveld Grease, long and well-conditioned	6½	7¼
O.R.C. medium grown, grown, light, with little fault	6	6½
O.R.C. short, faulty and wasty	5	5¼
O.R.C. Karoo grown, long and well-conditioned	6¼	6¾
O.R.C. medium grown, light, with little fault	5	6
O.R C. short, faulty and and wasty	4½	5

Mohair.—It will be interesting to our readers to learn from official sources that the total imports of mohair into London during the year 1905 were: From Turkey, 12,524.326 lbs.; and from South Africa, 12,532,482 lbs. During the year 1906 they were:—From Turkey 10,558,221 lbs.; and from South Africa, 15,581,291 lbs. The value of mohair imported into London during 1906 was as follows: From Turkey, £678,021; from South Africa, £969,331; from other countries, £87,680; total imports, £1,735,032. It will be noticed that there is a considerable falling off in the imports during 1906 from Turkey as compared with the previous year; whereas there is a very considerable increase in the imports from South Africa. The value of the imports from South Africa was about 56 per cent. of the whole of the imports. There is nothing new to report in the local market: a limited quantity of winter hair and mixed hair, chiefly from the O.R.C. and Basutoland, was sold during the week at 11d. to 11½d., and there is an enquiry for Summer Firsts at 14½d., at which price holders are not prepared to sell. The total stock held here will not exceed 4,000 bales, which is chiefly made up of Summer Firsts, for which we trust a more active demand will soon set in. On Tuesday's public market a limited quantity was offered, and no change in prices was established.

	d.	d.
Super Kids, nominal	18½	19
Ordinary Kids, nominal ..	16	17
Superior Firsts, (special clips), nominal	15	15
Ordinary Firsts, nominal .	14	14½
Short Firsts, nominal	13	13½
Superfine Long Blue, O.R.C. Hair	14	14½
Mixed O.R.C. Hair (average)	11	12

	d.	d.
Mixed O.R.C. Hair, very mixed	10½	11
Seconds and Grey	8	9
Thirds	6¾	6¾
Winter Kids (special clips)		14½
Winter Kids (good ordinary)	13	14
Winter Hair	11	11½

Skins.—Sheepskins sold this week in bundles, at 7¼d. per lb.; Pelts, 6¼d.; Capes, 2s. 4d. each; damaged, 9d. each; Goat, 14½d.; damaged, 6½d. per lb.; Angoras, 9¼d.; Shorn, 6½d.; damaged, 4½d. per lb.

Hides.—Sundried sold at 9¼d.; damaged, 6¼d. per lb.; Drysalted, 8d.; damaged, 5½d. per lb.; Madagascar hides, 7d.; damaged, 5½d. per lb.; Thirds, 3½d. per lb.

BREEDERS' DIRECTORY

AND GENERAL FARM NOTICES.

Notices under this heading are inserted at the rate of one penny per word per issue; minimum charge 2s. 6d. Payment must accompany order. Six consecutive insertions 10% discount; twelve 15% discount. Cheques and P.O.O. to be made payable to the Accounting Officer, Department of Agriculture, Cape Town.

HORSES.

Hugh A. Wyndham, Kromdraai Stud, near Standerton, Transvaal. Stud Stallions, Season 1906-1907. Broxton, d.b.h., 15-3. He is very well bred, being by Ayrshire, winner of the Derby, out of Farewell, winner of the 1,000 guineas, by Doncaster, winner of the Derby, out of Lily Agnes, dam of Ormonde, winner of the Derby, her dam Polly Agnes by the Cure—Miss Agnes by Irish Birdcatcher. Thoroughbred mares, £10 10s.: limited number of approved mares, £5 5s.

Narhillah, ch. h., 15 hands, by Baliol, out of Little Nell, by Lammermoor. He won several steeplechases in England, and ran seventh in the Grand National in 1904. Thoroughbred mares, £7 7s.; approved mares, £3 3s.

CATTLE.

HEREFORDS.

Young bulls for sale, sired by "Chain Armour" ("Armour Plate," 19838,—"Patience"). First prize winner Port Elizabeth and East London Shows, 1905-1906. Mr. B. Webb, Arundel Stud Farm.

JERSEYS.

Thoroughbred Herd. Celebrated Island bred bull "Clove," and several of the best cows and heifers from Mr. H. W. Struben's late herd.—Mrs. A. A. Dunn, De Tuin, Piquetberg.

FRIESLANDS.

Pure Frieslands. Enquire for cows, young bulls, and heifers. Oldest pure herd in Eastern Province. Grand milkers. Prize stock. Also, Colonial Rambouillet Flock Rams, limited number.—F. F. Wienand, Bellevue, Bedford, C.C.

R. Cross, Hillside, P.O. Bolotwa. Will have high-class Friesland bulls for sale from February next. Herd may be seen by appointment. Bulls from Imported and Colonial Cows.

Cattle—*continued.*

DEVONS.

Varkens Kop Herd of Pedigree Devons, quality, size, rich milk, very hardy, many prize winners. Cows, Heifers and young Bulls for sale. Ostriches, bred from best strains in South Africa; pairs for sale. Horses, "Typical South African Breed," untrained colts for sale. W. R. Southey, Varkens Kop, Schoombie, C.C.

SHEEP.

MERINOES.

T. T. Hoole, Atherstone, Albany Breeder of PURE GLENGALLAN PEDIGREE MERINOES. Late imported. *King Billy 39th.* Grand Champion. Champion and First, National Association, Brisbane, 1904. First Prize, family group and winner of ten other first prizes.

A. H. Murray, Portlock, Graaff-Reinet. Breeder of Rambouillet Sheep. Good combination of mutton and wool. Rams for sale from £3. Orders now booked for past season's lambs, to deliver 1907.

Rambouillet Rams, from Colonial Ewes, by Imported and Colonial sires. Sold at all Bedford Ram Fairs. Partridge Wyandottes and Indian Runner Ducks' Eggs.—Pringle Bros., Glen Thorn, P.O. Linton, Adelaide.

R. Pell Edmonds, Ripplemead, Dohne, Breeder of Pure-bred Pedigree Merino Sheep and Pedigree Black Welsh Cattle. —For particulars, see page xxxviii.

PIGS.

Arthur Jones, Green Bushes, Port Elizabeth Breeder of Berkshire and Large White Yorkshire Pigs from Imported Pedigree strains; Winners of 14 First, 6 Second Prizes and 1 H. C. at Grahamstown and Port Elizabeth Shows of 1905 and 1906.

OSTRICHES.

Specials only.—Chicks, £5 to £20 each; Young Birds, £10 to £30.—F. W. Baker, Laughing Waters, Willowmore.

GENERAL.

H. Vermaak, The Pines, Maraisburg, Cape Colony, has on hand and for sale at very reasonable prices, PURE-BRED FRIESLAND BULLS and PURE-BRED MERINO RAMS of the RAMBOUILLET breed.

THOROUGHBRED PERSIAN RAMS and OSTRICHES.—Hougham Abrahamson, Long Hope Siding, C.C. Breeder of Rams from progeny of ewes passed into Stud Book. of Cape Breeders' Association. Also selected Breeding Ostriches

PASPALUM GRASS PLANTS.—Quotations for plants, in bags free on rail Stellenbosch (keep moist long distance). See *Agricultural Journal*, May, 1906, page 622, or from A. C. Buller, Dwarsriviershoek, Stellenbosch.

W. Bullen, P.O. Box 1351, Cape Town, Breeder and Importer of Game, Houdans, Leghorns, Orpingtons, Wyandottes, Ducks, Geese, Homing and Fancy Pigeons at lowest prices (all risk taken).

PURE BRED ANGORA GOAT RAMS.

Bred from the Choicest Strains, and Prize-winners at the leading Agricultural Shows of Cape Colony. For particulars apply to A. B. Hobson, Martyrsford, Jansenville.

PERSIAN SHEEP AND OSTRICHES.

S. Montague Gadd, Springfield, Tafelberg. Orders booked for young rams, from Stud-book Ewes and for Ostrich Chicks from the best strains in the country.

THE POULTRY YARD.

PRIZE and UTILITY POULTRY of the BEST ENGLISH and AMERICAN STRAINS.—WHITE WYANDOTTES—PARTRIDGE WYANDOTTES - SILVER-PENCILLED WYANDOTTES—BARRED PLYMOUTH ROCKS—WHITE LEGHORNS — BROWN LEGHORNS—BUFF LEGHORNS—WHITE LA BRESSE. Stock and Settings of Eggs for Sale. Correspondence invited.—S. Smith, Talana, Wellington Avenue, Wynberg.

Geo. E. Barrett, P.O. Box 961, Cape Town. Importer of Poultry, Pigeons, Cage Birds and Appliances of every description, from Wicks Bos., Norwich. Trial solicited and Catalogues forwarded on application.

Ulyate Orpington Poultry Farm, Berlin, Cape Colony. Eggs from pure Black, White, Buff Orpingtons, Minorcas, Leghorns. Cock, Hen, and Poultry Remedies *for sale*. For further particulars write *now* for catalogue. Winners of hundreds of prizes.

BUFF ORPINGTONS.

THE FARMER'S FOWL. The fowl that LAYS WHEN EGGS ARE TOP PRICE and are also A 1 table birds. My Buffs have unlimited orchard and grass run, and are noted for hardiness and good laying qualities. Young stock always for sale at very reasonable prices. Ask for inclusive quotations; carriage paid to any station in South Africa and AT MY RISK to rail destination. My list of prizes won at shows all over South Africa will convince you that this unrivalled *Colonial* strain of 9 years' standing CAN HOLD ITS OWN AGAINST IMPORTED STOCK. Buy hardy Colonial-bred birds and save your pocket. Eggs from pure-bred utility strain, 12/6. Address: A. C. Buller, Dwarsriviershoek, Stellenbosch.

TURKEYS.

MAMMOTH AMERICAN BRONZE.—HARDY STRAIN OF GREAT SIZE. Noted prize winners. Young stock for sale after April. Orders booked now. Ask for inclusive quotations. Carriage paid to any station in South Africa and AT MY RISK to rail destination. Eggs in season. Full particulars from A. C. Buller, Dwarsriviershoek, Stellenbosch.

THE

Agricultural Journal

OF THE CAPE OF GOOD HOPE.

No. 3. MARCH, 1907. VOL. XXX.

Published Monthly in English and Dutch by the Department of Agriculture and distributed gratis to bona fide farmers in the Cape Colony on application through the Resident Magistrate of the District.

Advertising.—Approved Advertisements are inserted. Full particulars can be obtained of Messrs. Hart & Co., the Advertising Agents, Parker's Buildings, Cape Town (P.O. Box 898), to whom all communications *re* advertising should be addressed. Telegrams: "Advertise," Cape Town.

Postal Address:

The Editor "Agricultural Journal," Department of Agriculture, Capetown

Telegraphic Address: "Bulletin," Capetown.

CONTENTS.

PAGE.

NOTES— 292-298

Agricultural Show Changes.—Netting for Fruit Trees.—Yellow Liver in Ostrich Chicks.—To Lovers of Poultry.—Dried Locusts for Poultry Food.—Experimental Coffee Culture.—Classification of Sheep at Shows.—The Mania for Crossing.—In Full Agreement.—Port Elizabeth Museum.—Value of Agricultural Shows.—The Question of Judging.—A Tall Order.—Paraffin for Locusts.—Lime for Manurial Purposes.

FARM AND VELD— 299—306

Seeds for Trial.—Flue Curing Tobacco.—Locust Invasion.—Figs Casting their Fruit.—The Antestia Fruit Bug.—Swiss Milch Goats.—Cape Wools at the London Sales.—A Mohair Question: Mixed Kids.—The Samson Windmill.—A Windmill Competition.—American Vine Cuttings, 1907.

A TREATISE ON CITRUS CULTURE FROM SEED TO FRUIT. By W. E. Masters ... 307—325

AMERICAN RAMBOUILLETS FOR SOUTH AFRICA (*Illustrated*) ... ... 326—329

VINE MILDEW, OR PERONOSPORA. By C. P. Lounsbury 330-332

YELLOW LIVER, OR CONGENITAL FUNCTIONAL DEBILITY IN OSTRICH CHICKS. By D. Hutcheon .. .. 332—335

THE CARE OF MILK AT FARMS. By R. Silva-Jones ... ... 336—339

THE FLIGHTLESS BIRDS OF THE WORLD. By F. W. FitzSimons ... ... 341—345

POULTRY FOR PROFIT—THE VIRTUES OF THE WYANDOTTE 345-353

THE QUALITY OF MILK. By G. N. Blackshaw ... . 354—358

CATERPILLARS DESTROYING TREES ... . 358—360

RURAL CAPE COLONY, No. XXIV.—THE GAMTOOS VALLEY (*Illustrated*). By F. D. MacDermott 361-368

NODULAR DISEASE OF THE INTESTINES OF SHEEP, OR "KNOOPEN IN DE DARMEN." By D. Hutcheon ... ... 369—37

RETURN OF FRUIT SHIPPED FROM CAPE TOWN TO ENGLAND 372

THE AGRICULTURAL SHOWS (*Illustrated*) 373-382

GUANO ISLANDS COMMISSION'S REPORT ... ... 383—387

AGRICULTURAL SHOW DATES, 1907 388

WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION ... ... 389—390

CORRESPONDENCE 391—397

American Potato Blight.—Stink Clover.—Cheddar Cheese Making.—Unknown Disease among Sheep at Maraisburg.—Horse in Low Condition.—The Vitality of Ticks.—Suspected Senecio Poisoning at Bolo.—Bind Weed.—Arsenical Dip for Goat Scab.—Cure for Sponziekte.—Partial Blindness in Calves.—Jackal Extermination.—Millions of Swallows and Spreuws.—Scab in Potatoes.

RURAL REPORTS ... ... 398—402

NOTES ON THE WEATHER OF JANUARY, 1907 ... ... 403—408

RAINFALL RETURNS, JANUARY, 1907 408-410

CURRENT MARKET RATES 411

DEPARTMENTAL NOTICES 412

DEPARTMENTAL PUBLICATIONS ... ... 413—414

THE PRODUCE MARKET 415-418

BREEDERS' DIRECTORY 419

INDEX TO ADVERTISERS ... ...lxiii—lxiv

NOTES.

Agricultural Show Changes.

The Albert Agricultural Society's Show, announced to be held at Burghersdorp on March 27th and 28th, has been postponed till next year. The Umtata dates are Wednesday and Thursday, March 20th and 21st, not Thursday and Friday, as announced. The first day of this show will be for Europeans only, the second for natives only. In consequence of a reported outbreak of farcy in the village of Cofimvaba, the St. Mark's Show date has been altered to Thursday, May 23rd.

Netting for Fruit Trees.

Fruit growers in the Midlands and Eastern Province should note with pleasure that Messrs. Dunell, Ebden and Co., of Port Elizabeth, are now importing netting for fruit trees. Those who have adopted netting in those parts of the Colony all acknowledge its great benefit.

Yellow Liver in Ostrich Chicks.

Several correspondents having written asking for information on the above subject, we reproduce in its entirety in this issue the article by Mr. D. Hutcheon, which appeared in No. 13, Vol. XX.

To Lovers of Poultry.

Messrs. Geo. Findlay and Co., Cape Town, forward a most interesting poultry supplies' catalogue, up-to-date and complete. It is really a complete handbook on poultry-keeping as well, and teems with sound and reliable information. It includes the following articles, contributed in most cases by South African poultry experts, based on actual experience of poultry breeding in this country:—Poultry in South Africa; Raising Chicks in Brooders; Incubators and Brooders on the Farm—How Farmers and Farmers' Wives are making comfortable incomes with little expenditure; Foods and Feeding; Breeds for Profit; Health *versus* Disease; Profitable Egg Farming. Messrs. Findlay offer to forward copies free to any of our readers who will apply to them mentioning the *Agricultural Journal*.

Dried Locusts for Poultry Food.

The demand for dried locusts for poultry feeding is gradually growing, but the difficulty now is to procure them. Quite recently an effort has been made by the Department to procure ten bags for this purpose, but without avail. As the rail charges from the districts where the supplies might be obtainable would be rather high under the ordinary tariff, the Director approached the Railway Department. In reply, the General Manager stated that he was prepared to authorise the conveyance of dried locusts for poultry feeding at the third class rates, and has issued instructions accordingly. As he understands that this traffic will also be consigned from stations on the Central South African Railways, he is also approaching the other South African Administrations in regard to the rate to be charged in through traffic.

Experimental Coffee Culture.

Coffee has often been suggested as a crop which should add to the productions of South Africa. It has been tried on and off several times, particularly in the Eastern Province and Transkei on an experimental scale, and in Natal it was seriously attempted on a field scale some years ago. In the latter case it was rendered abortive by the ravages of *Hemileia vastatrix*, a fungus that attacked the plants with fatal results. In Lower Albany, the late Mr. S. Cawood, M.L.C., imported a number of plants, and did his best to induce the introduction of the industry on his farms in that district, but he also met with disappointing results. Others have experimented in the same direction, but nothing approaching a commercial output of coffee has ever been realised. In 1903, the Agricultural Department procured a supply of Arabian coffee seed, and distributed it in those parts of the Colony where it was most likely to be suited with climatic conditions. Recently the reports have come to hand, and the majority of these seem to be as disappointing as the earlier attempts. Bathurst reports a total failure from seed, all the plants that came up dying off. But of those raised from transplants sent up, four are growing and doing well. Kentani reports the disposal of the seed is unknown; there are some plants growing there, but they do not seem to be from the 1903 distribution. East London (Park) reports nine plants growing out of twelve, but none are bearing. Flagstaff (Pondoland) reports all seed died off. Elliotdale (Transkei) reports seed unsuccessful in three cases; in the fourth case it was accidentally destroyed; the opinion expressed is that it is unsuitable to the district. Cape Town (Municipal Gardens) reports negative results. Few plants left in pots. Seed planted out rotted in the ground owing to the wet. Lusikisiki (Transkei) reports the seed was grown successfully by Mr. L. Calvey, and sample of coffee was forwarded. Mr. T. Dredge, of Lilyvale, East London, states that out of the twelve plants sent to him eleven died when planted out where the sun could get at them.

The survivor has done well. He states that splendid coffee was grown on this farm previously by his father. Willowvale (Transkei) reports the plants to be thriving and bearing well. Grahamstown (Botanic Gardens) reports that the plants were killed off by frost, the winters being too severe for coffee. Although the greater number of these reports are far from encouraging, there is sufficient to shew that there is yet a possibility of growing coffee in the more favoured parts, especially in the Transkei. But the conditions that are essential to the successful prosecution of the industry on a commercial scale are not altogether favourable even there.

Classification of Sheep at Shows.

Mr. Cuthbert A. Pope writes from Molteno: "Mr. Rogers's letters on the classification of sheep at shows are of interest to all stock breeders because the principle involved can be applied to all stock in greater or less degree. I am not a breeder of stud sheep, but on broad principles I support Mr. Rogers's contention, and as you are evidently open to receive more opinions I would like to say that I must take exception to your own concluding remarks in the last issue of the *Journal*. You appear to me to advocate the use of different types or strains of Merino sheep for the purpose of building up a South African Merino. I cannot see the necessity or wisdom of such a method. I suppose the breeders of the different countries bred the Rambouillet, Saxony, Sturgeon, Vermont, Australian and Tasmanian Merinos to their present type because that type suited their purpose best. I don't think, but I write under correction, that any of them, except possibly the Tasmanian, used other than the original Spanish Merino. Why should our breeders mix up these strains, each long carefully bred to a certain type, and go through a long struggle to get this mixture settled to a fixed suitable type, when they can take anyone of these strains, and while keeping it pure, gradually modify it to meet their requirements? I feel sure it would be quite possible by selection and treatment, including their residence in Vermont, for a few breeders, to breed, say, pure Rambouillets to the exact type of the present Vermont Merino in the course of a long period without using other than pure Rambouillet blood. I feel equally sure that it would be much easier to take the strain which most nearly approaches the needs of this country, and modify it to the necessary extent by selection and keeping it under the conditions existing here. I grant that one could quickly breed a few first-class specimens by crossing the various types, but what about the rest of the flock, and how long would it take before such animals could be relied on to throw true to type?

The Mania for Crossing.

"One is constantly coming across men who want to cross-breed something, from a horse to a hen, in order to get the exact article required. Often they do get it, but one never hears that this "Eureka" reproduces itself. When one's Thoroughbreds are wanting in bone or action, cross them with a Cleveland or Hackney, they suggest. Why not get a Thoroughbred with more bone or action? When one's Africanders lack milk, cross them with a Friesland. Why not get an Africander with more milk? When one's Shorthorns lack milk or constitution, cross them with an Ayrshire. Why not get a hardier Shorthorn, or one from a milking strain? When your Cochin fowls lack breast meat and eggs, cross them with a Dorking, and again with a Hamburg—result, a Buff Orpington. It must be now quite thirty years since the originator of these fowls started forming the breed, and though bred by thousands of men the world over, they do not throw true yet. This is equivalent to ninety years with cattle, or sixty with sheep, and type of wool is, I fancy, rather a ticklish thing to juggle with. Of course, by breeding-in, a type can be set quicker, but there is another side to that question. The point I want to make is this: That there is no royal road to success in breeding animals to be gained by jumping from one breed or strain to another. Little by little, gaining a step here and there, while keeping the blood pure, is in my humble opinion the only real road to permanent success for stud breeders, and I give this for what it is worth. I am afraid I have made this letter too long."

In Full Agreement.

We may say at once that Mr. Pope's letter is none too long. It is most interesting, and the strange part is that he supplies the strongest of arguments in favour of our views on this subject. We quite agree with all he says as to crossing, and when applied to sheep would go further, and tell him it spells ruin. No one thinks of crossing a Merino with a long-woolled Lincoln to establish a fixed type of a fine fleece. One naturally mates the Merino with the Merino as Mr. Pope mates his Thoroughbred with a Thoroughbred. It is in this way that all the so-called types of Merino have been established. The foundation flocks were all Spanish, the types have been developed according to the tastes of the breeders in mating and selecting, and, above all, rejecting. Hence the difference between the Rambouillet, the Tasmanian and the Vermont, to take the three leading types. The Rambouillet has been bred for frame and carcase, as well as wool; the Tasmanian to produce fine wool principally, the carcase being a secondary consideration. The Vermont mostly followed the lines of the Tasmanian, but incidentally developed an excess of yolk or grease, largely owing to its environment. Now, in dry countries, like our Karoo and upper districts, and many parts of Australia, the tendency of the fleeces is to deteriorate, and become weak and "mushy" for want of yolk. Hence the use of the Vermont, in the same way as Mr. Pope would mate his Thoroughbreds or Shorthorns. In other words, he looks to make up deficiencies or strengthen points that may be weak by mating with members of the same family who can supply the need. The mistake we all make when speaking or thinking of Merino sheep is that we will look upon the various types as separate breeds. However, the question is interesting, and we trust to see it discussed further.

Port Elizabeth Museum.

Donations of specimens of animals, birds, birds' eggs, birds' nests, skulls, reptiles, fish, insects, shells, Native curios, fossils, minerals, and anything of local and general interest will be thankfully received by the Director of the Port Elizabeth Museum, and preserved either for exhibition in the museum with the donor's name attached, or will be utilized for exchange purposes with other museums, and to help to form a duplicate collection for study by school children and other students. The museum exists solely for the benefit of the public in general, and everything is carried free by rail or post.

Value of Agricultural Shows.

"Colonist" writes from Kimberley:—"It is with pleasure I note that you are raising the question as to the value of the agricultural shows from an educational point of view. At the present time they are to a great extent largely like a fair, providing a day's outing and amusement. As the Government provides such large sums towards the prize money and the encouragement of shows they ought to take more interest in noting that such money is used properly, and not wasted as at present. There is no doubt that the Government intention in providing these sums of money is to encourage agriculture and the breeding of high class stock, in the hope that our Colony may make a name for itself and become a producer, and eventually an exporter. The experts brought out to this country for the various Departments of Agriculture, etc., rank as professors and teachers, and the annual shows ought to rank as the annual examinations, and thus demonstrate whether the teaching has been beneficial or not.

The Question of Judging.

"Now comes the question as to the judging? The shows," continues our correspondent, "to be of value ought to be provided with the best possible judges obtainable, and these should be properly remunerated, as their task is often a heavy one, entailing a good deal of hard work and very careful discrimination. The judging should also be of a uniform nature throughout the Colony, similar to the examinations at the college, and thus a uniform result in the end would be obtained. How can this result be brought about? There seems to be but one practical method, and that is for judges to be elected annually at a conference to be called for such purpose, and for the arranging of shows throughout the Colony on dates that will not clash. Such conferences should consist of delegates from the various Agricultural Societies, from the Stud Breeders' Association, and from Government, and these should select judges, who, as far as possible, should attend all shows, and thus bring about uniform judging, and hence let the producers know what is actually required to reach perfection. These judges, who naturally would be experts, should also be able to give lectures and advice at the various shows, and thus point out where the points of failure in the various sections have arisen, and this would be of immense value to the country and producers.

A Tall Order.

"I quite realize," this writer admits, "that what I have said may seem a tall order, so to speak, but if readers will carefully think the matter over, they will acknowledge that it should be gone into carefully, and that soon, so as to arrange for next year's shows, otherwise it simply means waste of public money year after year, and little advantage either to the country or the exhibitors. I do not know if such an examination exists, but it would be a good move if Elsenburg students were encouraged to qualify as judges. Their examiners, of course, would naturally be appointed by Government, who would, in the case of live stock, choose men from the Stud Breeders' Association, which is doing so much good in creating standards of excellence. It is to be hoped that this subject will not be allowed to rest, but that those in the position to give advice, will come forward and bring about a better condition of things. There is a great deal more to be said, and I hope the views of many will be given in your correspondence pages."

Paraffin for Locusts.

The following letters have been received by the Government Entomologist:—I have the honour to inform you that I have been experimenting with White Rose Oil on locusts, "voetganger" class, and find it very much superior to the soap solution, as the soap solution only kills those thoroughly drenched, whereas White Rose Oil not only kills those that get wet, but if any of the swarm come in contact with the dead, they die as well. I am quite confident that should Government give a helping hand, the locust plague will be practically at an end. Hoping you will bring this before the notice of the authorities.—Yours, etc., E. L. STEYN, JUNR., Douglas, February 7th.

Last year I had the Government spray for killing locusts, and used the blue soap solution. Where swarms were in the vicinity of the homestead or near dams of water this answered very well. This year I have been supplied with the arsenite of soda, and though for destructive purposes very good, the poisonous properties have their drawbacks, as you know. I have never in all my years of farming had so many "voetganger" locusts as now, and a few days ago, in sheer desperation, sprayed a few swarms with White Rose Oil, and found this the most perfect destroyer yet used. My motive for writing you is to ascertain if it will be possible for you to bring this latest idea under the notice of the authorities. If Government would give the paraffin to farmers on the same terms as the blue soap I feel sure we shall get nearer mastering the locust plague. A single drop of oil on the locusts kills them, and the sprayed ones jumping on the healthy ones, the latter become as it were paralysed and eventually die. Trusting you will endeavour to procure the co-operation of your Department.—Yours, etc., E. L. STEYN, Vlakpan, Douglas.

To these letters the Entomologist replied:—The efficacy of paraffin oil for destroying locusts is well known to us, but the cost is generally considered prohibitive. Some parties have said that they were able to set fire to the swarm after spraying a little, but an assistant tried this last year and reported failure.

Lime for Manurial Purposes.

Application having been made by a farmer in the coastal belt as to the rates charged by the Railway Department for lime shipped from up-country for manurial purposes, representations were made to the railway authorities, pointing out the advantages that would accrue in many districts if the farmers could obtain this very necessary fertiliser at reasonable rates. In reply, the General Manager informs the Director of Agriculture that arrangements are being made for lime for manurial purposes, consigned coastwards in truck-loads of not less than five tons, owner's risk, to be charged at the same rate as kraal manure, namely, ¼d. per ton per mile, plus 10d. per ton terminals. It will be necessary in each case for a declaration to be made that the lime will be used for fertilising purposes. This is evidently subject to some modifications, for in quoting for a specific rate from Halesowen to Grahamstown, the rate is given as ¼d. per ton per mile, plus 10d. per ton terminals to Alicedale, and ½d. per ton per mile, plus 10d. terminals thence to Grahamstown.

FARM AND VELD.

Seeds for Trial.

The trials of new seed of many sorts by farmers co-operating with the Department is proceeding very satisfactorily. At present over fifteen hundred farmers are assisting in the work, and the reports to hand are instructive to a degree. It is very desirable that the fullest information obtainable should be collected before results are published in order that the information may be as complete and accurate as possible. It is particularly requested that all who have received forms for report will, as the crops mature, fill them in and return them, whether successful or otherwise, as only by this means can reliable generalisations for the guidance of the public be compiled. Those who have received forms and have not furnished replies cannot expect to have requests for further supplies of seed sympathetically treated.

The stocks of several varieties which are finding favour are for the present exhausted, but the following are available for the approaching sowing season. All applications for seed are to be addressed to the Agricultural Assistant, Department of Agriculture, Cape Town, and it must be remembered that the sole condition attached to the free distribution of parcels is the undertaking to furnish a report on the success or otherwise of the trials in due course.

Vetches.—Spring, Winter and Scotch Gore.

Beans.—Scotch Tick and Scotch Horse.

Turnips.—Fosterton Hybrid, Purple Top Mammoth, Green Globe, Imperial and Improved Early.

Mangold.—Yellow Globe, Orange Globe, Giant long red.

Rape.—Essex, Winter and Summer.

Kale.—Thousand-headed and Hardy Branching.

Swedes.—Monarch, Purple Top and Giant King.

Carrots.—Altringham.

Chicory.—Short Brunswick and Smooth Magdeburg.

Lupins.—Blue, White and Yellow.

Grasses.—Rescue Grass, Tall Oat Grass, Tall Fescue Grass, Devon Evergreen Rye Grass.

Lucerne.—Tamworth (Hunter River) and Turkestan.

Flue Curing Tobacco.

In view of the continued and growing interest in tobacco culture, the Department is distributing seeds of the best American sorts specially suitable for preparation in flue curing barns. This process has been shewn by actual experiment to materially enhance the value even of the kinds commonly grown. The undermentioned varieties are particularly suited for the production of that large, yellow, bright leaf so much sought after by the manufacturer, who offers from 1s. to 1s. 3d., and even more, per pound for this article properly grown and cured. Full information with regard to sowing and the curing process, together with a packet of one of the following varieties, will be sent to applicants willing to report the results of their experiments after trial: Conqueror Hester, White Oronoka and Goldfinder, for light soils; Flannagan and Little Oronoka for heavier lands. Applications should be addressed to the Agricultural Assistant, Department of Agriculture, Cape Town.

Locust Invasion.

The eastern part of the Colony is threatened with a more severe visitation by the brown locust than has occurred any year since 1893. So concludes the Government Entomologist, from the reports on the occurrence and movements of swarms furnished him by the Cape Mounted Police and by "postcard correspondence." Day by day swarms which were allowed to develop in the Colony are drifting further and further to the south and east, and it is feared that these will lay their eggs without returning. Parts of King William's Town, Victoria East, Stockenstrom, Albany, Uitenhage, and Willowmore districts have thus received swarms, while Fort Beaufort, Bedford, Somerset East and Jansenville districts above them, in which few or no voetgangers occurred last season, now have more winged locusts than the districts to their north. Meanwhile, voetgangers have appeared over an immense area to the north and west. Hopetown, Prieska, Carnarvon, Kenhardt and Gordonia, and to a smaller extent Fraserburg, all very large, thinly settled districts, were reported during January and February to have voetgangers in abundance, and from these districts it is probable that extensive migration of the resulting winged swarms to the south and east will take place in March, April and May. Extensive hatchings have also taken place recently in Kuruman and Taungs. Perhaps the best thing we can hope is that when the swarms migrate the winds will carry them too far and deposit them in the sea.

Figs Casting their Fruit.

Mr. W. M. Pfaff writes from Humansdorp:—"Per Parcels Post I am sending you samples of diseased figs. I have two trees of this kind (Castle Kennedy), perfectly healthy in appearance. For the first crop each tree had about 20 figs, which ripened perfectly, a few measuring ten inches in circumference and three inches in height. The second crop covered the trees, say, 2,000 for each tree. Then, when they reached the size as per sample, they turn brown and drop off. The one sample fig is healthy, the milk flowing freely when I picked it this morning, but in the others there was no milk. There is an Adam's fig tree next to these trees, also covered with figs, but the figs are all perfectly healthy. Then in another part of the garden I have "white fig" trees. These are also perfectly healthy, and these are ripening fast. I had better tell you that the Adam fig trees and the white fig trees had no early crop. Last year the Castle Kennedy figs behaved exactly in the same manner. I shall be thankful for any advice as to a remedy."

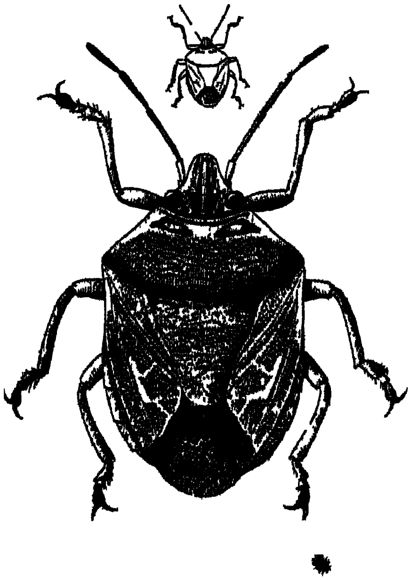
There is no disease in the samples submitted. It is a case of arrested development owing to non-fertilization. Mr. Pillans, Horticultural Assistant, submits the following memo. on the subject:—The fig is a very peculiar production, in its mode of growth very different to other fruits. The young, undeveloped figs do not start from flowers, but spring from the axils of the leaves, like small buttons, and as they increase in size, swell out into top-shaped forms, narrow at the base, but rounded and flattened at the summits, which carry an opening or orifice at the apex protected by fine scales which represent the eyes of ordinary fruit. Inside this stout, smooth skin or receptacle are enclosed a number of small flowerets growing from the walls of the receptacle, both male and female, the former at the base, and the latter nearer the apex. As the fruit ripens, these become seeds embedded in the fruity portion of the fig. Now, if the young fruits be carefuly examined from their start in life, it will be noticed that some of these, at times many or all, and again often none, have the orifice so open and free from scales as to permit of their being sucked at or fed upon by insects; these are the fruits that will ripen.

Others again are covered with a scale which does not permit of their opening and becoming caprified by insects; these are the fruits the tree will cast, and not ripen up. It will also have been noticed that the first crop of certain figs sets and becomes matured, while the second crop falls off, and this is specially the case in certain varieties, such as Castle Kennedy and the Smyrna. The vigour of the tree forces the fruit of the first crop to open its orifice to admit feeding insects, whereas the want of vigour in the tree prevents this taking place at the second crop. If, though, the fruit be artificially pollinated or fertilised, it will set and ripen. Other sorts of figs, by their nature, produce and mature both first and second crops, as the orifice of the fruit is nearly always open in these. Until we have the Blastophaga, an insect which pierces the scaly substances over the orifice to get at the flowers, this casting of certain figs will continue. It would be wise if our correspondent only grew such sorts of figs as produce their crop regularly, such as the Brown Turkey, Adam Fig, White Genoa, Old White Cape, and the French fig, known as Gros Verte.

The Antestia Fruit Bug.

Mr. William Deas, of Oudtshoorn, writes: "I am sending you some specimens of an insect at present to be seen in thousands on the peach trees here. They devour the leaves, as well as the fruit. I have not seen them here before—in all probability a fresh importation. Should be glad to know what will be the best remedy for their destruction."

On this Mr. C. P. Lounsbury, Government Entomologist, submits the following memo.:—The insect is *Antestia variegata*, Thunb., a native species of plant bug. The accompanying figure may serve for its recognition. Most of the upper surface is flesh coloured, but so thickly beset with black impressed dots as to appear greyish. The parts which shew light in the figure are mostly orange coloured, and the base of the membranous portions of the wings is almost solid black. I have recorded the insect only from the Cape and neighbouring districts in the south-west of the Colony, but it probably occurs all round the eastern coast and inland to the high veld. The Natal Entomologist records it in coffee plantations in Natal, and it is said to be a coffee pest of some importance in British Central Africa. A similar insect which has been classed as identical by Mr. W. L. Distant, of the British Museum, but which to me appears distinct, frequents the harpuisbosch (*Euryops tenuissimus*) in the Eastern Province. The Antestia is a common insect in the Cape district every year, but although I believe it to do a good deal of mischief, it seldom attracts the attention of farmers, and damage by it is ascribed to other causes. This is largely because it is unusual to see more than one or two at a time, and because the injury does now shew immediately. On the slopes of Table Mountain, it is common on the Taaibosch (*Rhus glauca*), the berries of which it appears to puncture and suck, and I have noticed it on a congeneric veld bush in other districts.



Apple trees are much frequented by this insect, but although the fruit evidently gets much punctured, I have observed no more result to follow than a slight surface speck. In time to come, however, decays may spread which will enter by the wounds, and cause serious injury. Next to apples, peaches seem to be the most pestered of the cultivated fruits, and the injury to them is much more noticeable. Large numbers, rarely a whole crop, are punctured while very young, sometimes in a score of places. Gum exudes from young fruit, and may hang in a string from each spot. Often the fruit develops irregularly when much injured, becoming gnarled and lumpy, and consequently of little commercial value, although of fair size and unimpaired flavour. Nearly mature peaches may decay where punctured. As already noted, a farmer is unlikely to notice the insect. It is rarely present in numbers, and when it is disturbed it has a way of sliding quickly out of sight. The eggs are laid in patches of about nine to twelve, generally on the bark or the underside of leaves. They are almost round, greyish-white, covered with a fine powder, and about a twenty-fifth of an inch in diameter. Fresh-looking adults are found in October, and during November eggs and young bugs are about. The specimens from Oudtshoorn look as if recently moulted, so fresh are they.

Hand collecting into a receptacle such as a pickle bottle with a little oil at the bottom is probably the best remedy in an orchard. I do not think any spraying measure would prove satisfactory, and unfortunately the insect is not one of those which will drop readily on to a sheet spread to catch it when the tree is jarred or shaken. It is least active in the cool of the day, and is then most easily caught. Eggs should be watched for and destroyed, and the young bugs, which have been likened to ladybirds in appearance by farmers whose acquaintance with insects is very limited, should get as much attention as their elders. The correspondent says that the insects devour the leaves as well as the fruit, but I suspect that he is confusing damage from distinct causes. The bugs are able to take liquid food only, and I have never observed them to seriously affect foliage. A peach leaf was enclosed with the specimens, and this was certainly in a most unhealthy condition, but owing to prune rust, not to the insect. The rust is a fungous disease that very commonly attacks peach foliage, but usually it does not appear early enough to do serious harm; it gives the leaf a speckled appearance.

Swiss Milch Goats.

Mr. W. Rubidge, M.L.A., writing from Graaff-Reinet, says:—The following may interest some readers of the *Journal* if you care to publish it. In April, 1904, a Swiss ewe kid was born. In July, 1905, she gave birth to a ewe kid; February 14th, 1906, twin ewe kids, November 14th, 1906, these ewe kids, only eight months old, gave birth to three kids (one twin, one single). On February 6th, 1907, the mother gave birth to twin ewe kids, making a total of ten from the one before she was three years old. Since July, 1905, she has not been out of milk for a single day, and now has more milk than her two kids can consume.

Cape Wools at the London Sales.

Mr. Lewis Fordham, wool broker, of Guildhall Chambers, Basinghall Street, London, in his report on the London wool sales, dated January 31st, says:—"In Cape produce the new season's wools have proved a very attractive collection. The frequent price of one shilling per pound in the greasy state cannot fail to give great satisfaction to the growers. The relative price of a clean washed pound of good combing Cape is now higher than a similar grade in Australian wool, and repays the care now given to its classing. Prices were uniformly strong, even more than other wools, and in the early part of the sales often registered a 5 per cent. advance. Merino lambs' wool was in good supply, superior and medium clips meeting with more competition and higher prices. The very faulty brands, however, did not further appreciate in value, but sold under a better enquiry. Crossbreds were somewhat below the average in quantity, and in every instance of good breed fully realized last year's rates."

A Mohair Question—Mixed Kids.

Mr. E. R. Hobson, Secretary of the National Association of Wool and Mohair Growers, asks us to publish the attached letter on the subject of "Mixed Kids" from the Port Elizabeth Produce Buyers' Association. He says it has cost the growers many years of patient work to get a good name for South African "Kids," and it need only be pointed out to the Angora farmers that their interests in this matter are identical with those of the Produce Buyers' Association to secure hearty co-operation. The letter referred to reads as follows: "The practice of mixing 'firsts' with Kids' hair, which was the subject of discussion at a recent meeting of your Association has received the earnest consideration of my committee with a view, if possible, of finding some remedy. Buyers and sellers alike deplore the practice, and all members of this Association have agreed to make it their business to report any cases of fraudulent packing which may come to their notice, and the Association will act as circumstances will allow. My committee would be glad if your members will also assist by reporting any cases coming under their notice. It is hoped that by such joint action some good will result. The interests of buyers and growers being identical, you may rely upon everything possible that can be done at this end to effectually stamp out such fraudulent practices as those complained of.—Jno. S. Neave, Secretary, P.E. Produce Buyers' Association.

The Samson Windmill.

In the January issue we published a letter from Mr. Stephen A. McComb, asking for information as to the virtues of the Samson Windmill. Within a very short time of that issue being published, answers began to arrive from every part of the country where windmills are in general use, until now we have about thirty on hand testifying to the general excellence of the Samson. We need hardly state that space forbids our publishing them all or even extracts. Our correspondent must be content with the general verdict, which amounts to this: The Samson quite fulfils all that is claimed for it, is thoroughly reliable, and stands rough treatment and even neglect with a certain amount of equanimity. The self-governing device is spoken of as most reliable, also the self-oiling mechanism.

A Windmill Competition.

One letter, however, from Mr. C. E. Lawford, the well-known civil engineer of Mortimer, in the Cradock District, calls for more attention. Mr. Lawford has given considerable attention to the whole question of windmills for water-lifting and general farm purposes, as is generally known from his writings in the *Agricultural Journal,* and he is prompted by the correspondence on this subject to make a suggestion which should prove very helpful to all users of these machines. The windmill, like every other implement in general use on the farm, has to be suited to the conditions in which it is to be employed, and also to the work it is expected to accomplish. It, therefore, follows that what may be a perfect machine in one set of conditions may fail in others. Now to settle the questions here involved, Mr. Lawford suggests an open competition for windmills to be arranged by one or other of the larger Agricultural Societies with a view to not only pointing out the best but also the good and bad in each. This he maintains would lead to general improvements in all, and a consequent large increase of business. He suggests twelve months' notice to be given of a competitive trial to be held next year, with the conditions of entry and the value of the prize, which he thinks should be not less than £50. All agents would then have sufficient inducement to compete if their mills were any good, and there would also be sufficient time to bring them up to date. The judges should be carefully selected and allowed to control the conditions, otherwise the agents might so influence the wording as to nullify the value of the competition, when the want of confidence in the awards of to-day would still continue. The judges should be asked to point out the good and the bad in each, and their reports be published in the *Agricultural Journal,* when both the farmers and the trade generally would benefit enormously. The suggestion is an excellent one, for we can fully bear out the want of reliable information among our farmers on this subject, as well as the many disappointments which they experience Were the Port Elizabeth Agricultural Society to take this competition in hand we believe it would result in all the advantages Mr. Lawford foresees.

American Vine Cuttings, 1907.

The distribution of American vine cuttings this year from Groot Constantia will commence as soon as possible after the 1st of June. All applications must be sent to the Local Board of Distribution for the district concerned (addressed care of Civil Commissioner), on forms obtainable from C.C.s and field cornets, not later than April 15th. The Local Boards must advise the manager, Groot Constantia, not later than April 30th of the number of each variety applied for, when they will be informed as to the number available. On receipt of this, the Board will allot the cuttings and notify applicants. The complete lists, shewing to whom the Boards have allotted cuttings, with postal and railway addresses, should be forwarded direct to Groot Constantia not later than May 25th, when allottees will receive their cuttings direct from the nurseries. Cuttings will be charged for at the rate of 10s. per 1,000, and will be not less than three-sixteenths of an inch in thickness and twelve inches long.

A TREATISE ON

CITRUS CULTURE FROM SEED TO FRUIT,

Shewing the Influence of the Stock.

By W. E. Masters
(Formerly of Grahamstown, C.C.)

(*Continued from Page 172.*)

Stock as Affecting the Fruit.

The influences of the stock on citrus fruit are only conspicuous when—

(1) The stock shall greatly differ from the fruit (as, for instance, the lemon and orange), and

(2) When the stock is able to exert its full unchecked influence in complete affiliation with the scion, and by ample moisture.

With regard to the opinions of other writers, no works I have seen have any direct bearing on the subject at all. The nearest approach to "Stock-influence" is on Page 25, Chap. V., of "Citrus Fruits and their Culture," 1904, in which Professor Hume, of the Florida University, discredits the statements of MacFayden and others, that sweet orange seed frequently produced trees bearing Bigarade (Seville) Oranges. He avers it to be a myth, "which, like many another, found its way into and obtained an abiding place in botanical and horticultural literature." In the light of my own personal observations, I agree with both parties; the observations of MacFayden being perfectly accurate, and the botanical knowledge of Hume unquestionable, but as that particular branch of botany makes no allowance for stock-influence, "botany" must accept the responsibility or provide the remedy.

Another instance of stock-influence occurs in that sterling work "Plant Breeding," by L. H. Bailey, 4th Edition, April, 1906, in which an addition by Herbt. J. Webber, of the United States Department of Agriculture, on Citrus breeding, Page 279, is quite unintentionally and unwittingly adduced. Mr. Webber is here describing the behaviour of three cross-pollinated varieties of Citrus fruits termed *Citranges,* named, respectively, the Rusk, Willits, and Morton.

The "Rusk" originated from a female flower growing upon an orange stock, pollinated by a Trifoliata male flower, which resulted in a hybrid variety, "a beautiful little fruit resembling a tangerine orange in colour and appearance, being nearly round, and reaching a maximum diameter of about two inches . . . slightly bitter . . . eaten with sugar, etc."

The Willits, which was produced by pollinating a female flower growing upon Trifoliata stock with pollen from an orange flower, *is very similar to a lemon*, and is the phase of 'stock-influence'' I previously referred to as occurring unintentionally.

The third one, Morton, which is a hybrid of a Trifoliata pollinated by (the male) orange, "produces fruit as large as the ordinary orange, and so similar in appearance to the orange that it can hardly be distinguished as a distinct fruit . . . eaten with sugar, etc."

In the "Rusk," my experience of stock-influence leads me to believe that the female orange flower was growing upon (a seedling?) an orange stock, as also the male Trifoliata blossom was growing upon its own Trifoliata stock; which experiment being the exact reverse to the "Morton" seems to establish the accuracy of my conjecture, by both clons or varieties partaking of the positive forces innate in the pollen.

The "Willits," however, presents a totally different result, and as there are no "freaks" in nature, and as no effort is made to account for such an unwarranted departure or peculiarity as manifested in the "Willits" it goes to prove my contention that amongst the greatest botanical scientists of the present day stock-influence is an unknown and unestimated force. The conclusion I deduce from the behaviour of the Willits, based not on my own cross pollinating experience, which is *nil*, but on a study of stock influence, is that the stock which carried the positive element was growing upon a *lemon stock*.

Experiments of a nature to warrant their inclusion in a book carrying the guarantee of Professor Bailey's name, are doubtless most carefully conducted and reliably recorded, and it would not be difficult to refer to them again and conclusively ascertain what part stock-influence played in forming the "Willits."

To my mind there are many phases in horticulture which seemingly nothing short of the botanical inclusion of stock-influence can account for, but as I am not a botanical student but merely a simple farmer with a craze for investigation, I must perforce place business first.

In pursuit of my investigations to determine the action of the stock upon the quality of the fruit, I doubtless appeared an ignoramus to many, for which I heartily apologise, but it must be conceded that the man *who knows* has very much less chance of finding things out than the amateur desirous of learning.

Putting on one side my investigations into the methods practised in various nurseries, which, in view of the publication of this book, will doubtless be speedily altered, I found the best fruit in private groves growing upon seedling *orange* stocks, and to which Root-rot had not penetrated. Trees here were grown by the owners or by their parental predecessors themselves resident on the properties. On these farms or estates wherever I went I found what I wanted, often more than I anticipated. "Mongrelising" had never been introduced. Cultivation was often disgraceful, but the flavour of the fruit was excellent.

In the best of these high-class gardens—I do not think those very worthy monks, the Trappists, at Marian Hill, in Natal, would be displeased at my mentioning what I found there in addition to extreme kindness and courtesy—I found a "Navel" orange, seemingly a typical first-union mongrel scion grafted on to what was believed to be a sweet orange stock. This was the only element of confusion I found. The fruit was not highly commended by the "Brother" who had charge of the orange garden, proving that the mongrel influence of past varied stocks had not been dissipated by a simple first-union with the sweet orange. I could not ascertain its previous stock history. Through the kind influence of Brother Valentine, I brought several scions from their choicest trees, grafting them on to lemon stocks, having at the time nothing else available. One especial favourite, a "selected" orange, refuses to make good growth (on the lemon) to this day. The others all rank as typical cases of "first union grafting" and are not worth discussing here. I consider I acquired more definite knowledge in Natal than elsewhere, not so much from the country itself, perhaps, as from the mixed population to be found working in the vegetable gardens from Port Shepstone to Malvern, many of whom had worked in the Mediterranean groves.

One, an Armenian, who claimed to have been born in an orange grove at Jaffa, gave me much information which for primitive conditions and *fruit* seem hard to beat. I may refer to his information again. Seville stock had been tried there, but did not produce good fruit. He knew of no case where a scion had been cut from a Seville stock to try on the Seville stock again; the idea was absurd!

This misconception is worthy of further remark inasmuch as the prevalent ideas unconsciously absorbed and retained by many such provincial orange-growers throughout the world invariably cause them to believe that a first-union failure will be doubly unsuccessful at a second-union—*without trying it.* Yet their own successful system of using an indigenous orange-grown scion for another similar indigenous orange *stock* utterly disproves the belief.

Wherever communities work together throughout the world and are their own nurserymen, the style or methods comprising their system go to create specialisation (citrus stocks being very few) without being aware of it. My deductions, although not concluded until I have written the last word in this book, have shewn me—perhaps not so much by my own personal experiments, as by those of hundreds of others who have never heard of such a thing—that stock specialisation must be continued, and according to the grade or quality of the fruit produced by the stock itself, in conjunction with its action on the fruit of the scion, so merit and notoriety is secured and maintained, or never won.

Hitherto throughout the world this fact seems not to have been recognised; nevertheless, in Bahia, California, and Florida, their present success with varied stocks has been gradually evolved by unknowingly adopting the only means whereby specialisation has been established.

Stock Selection

Putting aside the aspect of stocks as early bearers, we find but two desiderata required by the fruit-grower or demanded by commerce. The first and most important requisite being the capacity of the *stock* to produce high-grade fruit in both quantity and quality, and the second qualification equally as imperative—the capacity of such stock to withstand the most prevalent or serious disease to which it may be exposed and to conform to the soil characteristics and meteorological conditions of the country.

How far these requisites can be met will be found amplified under various headings.

How to obtain high-grade fruit.

It has been shewn, or will yet be shewn, that high grade fruit can only be produced by equally high-grade stocks; that is to say, stocks which of themselves are able to produce almost equally fine or identical fruit, owing to influences swaying the stock which in harmonious concordance with natural laws, are the principal factors in forming the juices giving *quality*. Further, it will yet be shewn that the only way in which the growth of the grafted variety may be made to equal the growth of the stock, is by constantly associating and re-associating again and again the tree carrying the scion that produces high-grade fruit with another stock similar in all respects to that on which the high-grade fruit is already growing and flourishing to perfection.

Every departure from this system of constant re-association can only, by the injudicious use of dissimilar or inferior stocks, depreciate the quality of the fruit, or promote early bearing and dwarf the growth, or create mongrelising and devitalisation; each or all in a corresponding ratio to the extent of its predominance.

Here I feel impelled to insert a short parenthesis to the main question. The science of botany as at present systematised discredits the fact that an "orange" can be altered by the stock on to which it may be budded.

It argues, "Once an orange, always an orange," and so far as superficial appearances go, the statement is correct; but as concerns merit and flavour—which after all constitutes the intrinsic value of an orange—*the fruit partakes of the nature of the stock.* If the stock is a lemon, the fruit becomes thereby acidulated as is clearly proved later on. The *extent* of the depreciation (in the case of an inferior stock) or acidulation (in the case of the lemon stock) depends principally upon the order of its union, ample moisture (rain), rich soil, and whether budded or grafted and with what wood.

The question of how to produce high-grade fruit opens out the further question as to why "stocks" are a necessary feature in fruit-production? In the case of citrus, it is because of Root-rot; with apples, American blight; or with vines, phylloxera, etc., each barring the way to a return to the normal conditions that existed prior to their advent; thus with citrus the first consideration is *Mal-di-gomma* (or Root-rot). If this disease is the power many claim it to be, then the question devolves into "what *stock* shall replace the common or sweet seedling orange?" which further resolves itself into these sub-divisions:—

(*a*) Are we justified in believing we know sufficient about the origin and cure of Root-rot to re-adopt or re-instate the sweet-seedling orange?

(*b*) Choosing the next best stock, resistant to Root-rot, what that stock shall be?

(*c*) How such stock will affect the quality and yield of fruit?

With regard to the sub-division "*a*," I consider I am neither qualified nor competent to pronounce a definite opinion upon so large a question. I have an opinion which will be found in the appendix, but that opinion, unknown to myself, may have been acquired in any other way than of knowing the whole factors in the situation and deciding with full knowledge and capacity. In the Mediterranean, notwithstanding their cultural methods vary but little, men who have worked there informed me that it comes and it goes. It kills, they replant; or, as seen again in New Zealand and Australia, it comes, and is cured. The query, therefore, arises, can there be two forms of Root-rot, one more destructive than the other? I cannot answer the query. The man who plants his trees must decide it for himself, and incur the risk, if risk it be, duly considering our unequal climate and rainfall. As periodical excesses of moisture against which at times nothing seems proof, or, on the other hand, the long, dry spells necessitating the use of more and more water, the scarcer water becomes, I feel I am on safe ground as regards "*b*" in advocating the use of the "Seville" for situations having a plentiful water supply, but the Seville—like the pamplemous—will not thrive in dry, open soils. It is not suited nor built for such soils.

Both the Seville and pamplemous are practically Root-rot proof, and both may be trained on the "Masters system." The common lemon succeeds in dry, open soils better than anything, but cannot be "trained," and is not resistant to Root-rot. The common, or sweet seedling orange on such soils is preferable to the lemon, and I venture to predict that if the common lemon were used and "selected" as a fruit-producing machine to the same extent as is done with the seedling orange, its supposed resistancy to Root-rot would be less than the latter. The lemon, and sweet seedling orange make the best stocks for dry, open soils, or "droughty" areas, but unless stock-influence can be controlled in the case of the lemon the experience of future planters may be as disastrous as my own (*see* Crossing).

With regard to "*c*," the question will be found fully explained and logically reasoned out in the chapter dealing with the Seville stock.

CHAPTER VI.

THE SWEET SEEDLING ORANGE.

Its Value as a Stock.

This orange, wisely chosen from a healthy high-grade seedling tree, is absolutely ahead of everything else for an all-purpose stock for *Oranges*. It has no rival. It is practically an indigenous tree that has adapted itself to the entire demands of climate, soils, and conditions throughout South Africa. If it were not for the sword of Damocles ever thought to be suspended above it (or below?) in the shape of Root-rot, this stock would be the acme of perfection, and if selected as hereafter described, and propagated, as recommended under "Seeds," it would be found faultless and true. There are many groves of seedling oranges in this country irrigated by the old-fashioned "basin" system where Mal-di-gomma is still a stranger, howbeit, their number is diminishing.

There are also in this country many "Root-rot free" parts where the planting could be largely extended Doubtless also there are many intelligent growers, men of leisure and wealth, who being fully aware of the systems of cultivation most likely to generate or render trees susceptible to Root-rot, would have sufficient confidence in themselves and in their discriminative knowledge to plant seedling stocks on a large scale, whereon to grow "unmongrelised" pedigree oranges to build up an export trade—if warrant could be shewn for it, which, under proper regulative methods, might add millions per annum to the exports of this country. Money must be invested, and intelligence must reside on the soil, and both be exercised wisely and well to raise this Colony to affluence by means of fruit-exportation. The one thing hitherto lacking, namely, an actual practical guide to citrus culture, founded on common-sense principles, and proven by practice, has never yet been put forward by anyone.

Those who have tried and failed from reasons previously explained and intend planting nothing but seedlings, should study this book carefully and profit by its teachings, if they are to succeed where others have failed.

They would seem to be on safe ground in planting seedlings, if they know where the best are to be found, and can obtain them properly raised and truthfully selected, but wherever Root-rot has killed off groves, or even isolated trees; large plantings could not be termed a safe investment until more be known of the origin of the disease. The "Masters System" makes no claim to grant immunity against Root-rot to the sweet seedling orange. The seed may be carefully selected, as recommended, but it must be patent to all that selection is insufficient of itself to create a resistant tree. It is pure theory, and although the reasonable inference seems to warrant the assumption that it would be an additional safeguard *where the disease had never occurred,* or for areas where Root-rot seems never likely to penetrate, yet it may not be verified in years to come. A sand, with sandstone below it, giving natural drainage, seems to be the last place Root-rot would enter; but in the face of the divided opinion concerning Root-rot who can say?

Viewed from what I *know*—not what I imagine—I consider a healthy seedling orange properly planted in suitable ground, properly drained, carefully tended and watered, and whose foliage is thinned from time to time to allow the sun to filter through, I say I consider such a tree preferable in every way to the low-down-grafted so-called "resistant" stocks, whose scion (tree) often touches the actual surface of the soil. Moreover, having the reputation of being resistant, they are planted carelessly, watered carelessly, and tended carelessly, and are often anything *but* resistant.

A large proportion of the despicable trees classed as "seedlings," which one sees in this country result from the false economy of pampering the weakling trees to make them grow (*See* Seed Selection). When the choice can be made between Colonial-grown orange seed, whether sweet seedlings, or Seville, it is in favour of the more acclimatised, root-trained, drought-trained Colonial-grown seed.

The seedling orange is the pioneer orange of this, as well as other countries, and if it had never been used as a stock, or grafted on to other stocks, the seeds of every seedling tree, emanating from the original, would reproduce themselves again, true to seed, provided, of course, that the first seeds introduced into this country were of themselves true seedlings. This constitutes a danger that only seed planting on the lines before suggested can remedy, because all mongrel influences being weaker than the paramount influences emanating from the true seedling, or true specialised stock, can in this way be disposed of and not reproduced by planting out. As soon as a departure is made from propagating from the seed of true seedlings, by using seed grown on grafted seedlings, even if such trees are grafted on to but slightly dis-similar stocks, the seeds from such trees come no longer true, and should only be used as stocks for some selected or higher-grade variety.

Mongrel seedlings unfortunately outnumber the true seedlings, and although both may be used as stocks, if of equal vigour, yet the truer the stock, the more definite the knowledge becomes of predetermining a certain result.

Sweet Seedlings for Fruit.

If we select certain sweet seedling oranges commonly known as, and invariably termed, “seedlings” growing in this Colony by hundreds and contrast them collectively—throughout the length and breadth of South Africa—with the named “pedigree” varieties so very highly commended, we find that as regards appearance, taste, and aroma, as well as in the abundancy of their production and the marketing capacity obtained from an acre of ground at 10 to 12 years from planting out, that everything has been in favour of the selected seedling orange. There are, as I am aware, a few exceptions where “specialisation” has been accidentally created, but which will not affect the statement as a collective whole. The more one sees of the behaviour of these high-grade “seedlings” and contrasts them with the lamentable deficiencies exhibited in the imported “pedigree” varieties, the more one fails to discover—apart from Root-rot factors wherein lies the causes of past rejection.

The name or group “seedling oranges” unfortunately includes the very worst, as well as the highest types of Colonial-grown oranges, sold in the open markets with no other distinction than the grower's name. This baneful practice condemns the best quality really high grade fruit—by bringing all to the common level of inferiority. The group “seedlings” include also “sweet” oranges, soured by the use of inferior stocks, as also the hard, juiceless, apologies, mis-called “Cape oranges” that one is introduced to on the mail steamers, from whence passengers entering this country imbibe their first impressions, forming quite erroneous conclusions as to the *de*-merits of Cape oranges. They forthwith convincingly preach the necessity for improvement in varieties, in ignorance of the fact that merit exists.

Several nurserymen in this Colony, recognising the merit of selected seedlings, are forthwith naming them and propagating largely by grafting them on to stocks. Unfortunately for this practice, which otherwise is to be highly commended, merit will not be maintained unless they become *grafted* on to sweet seedling orange stocks with no other stock intervening; that is to say, the scion must be cut from such selected tree, and grafted direct on to sweet seedling stocks, as will be found fully explained further on. The “seedling” orange is condemned by some in ignorance of the true state of affairs; and by others from self-interest. When it becomes everyone's business to rectify abuses, as for instance, to re-establish the reputation of the selected seedling—it generally proves to be nobody's, hence the seedling orange remains "unhonoured and unsung," condemned for lack of one leisured man who will prove the case in the country's interest!

Among actual growers this orange stands pre-eminent as the "all-round" tree, capable of producing fruit when others fail, acclimatised, and, Root-rot excepted, understood and appreciated at its proper value by the few who know its real capacity. There is, however, this to be said against them as a "group," that they are a disgrace to themselves as such, and the sooner the high-grade seedlings are properly distinguished by name, and systematically propagated, the greater will be the profit attached to their cultivation. Any grower possessing inferior seedlings, and their name is legion, would be wise to work them over to specialised Bahia, or some of the high-grade selections known to exist.

The selected seedling orange may be truthfully summed up as "An orange superior to all other pedigree varieties (enjoying no distinctive features) growing in South Africa to-day, but condemned by want of selection and pedigree."

As an Export Fruit.

Notwithstanding the undoubted merit of the selected seedling orange, over and above every other orange growing in this country to-day, excluding the exception just mentioned, there is one most important point against it, which simple merit alone, will have great difficulty in overcoming. Fashion and novelty invariably rule the markets of the civilised world, mere merit, in luxuries particularly, often becoming a secondary qualification until fashion shall change.

Thus, assessed as a commercial problem only, if fashion demands a particular distinctive orange, having the charm of undoubted merit, and fashion is prepared to pay for it, then it would be to the advantage of the grower to meet it as fully as the Southern Hemisphere allows, which, in my opinion, could be better done with the Navel type of orange. Thus *merit* in the selected seedling might become secondary to the dictates of fashion, and the rage for novelties, as each vie with the other to obtain the possibly inadequate supply of fashion's favourite, which, so far as I am aware, can only be produced south of the Equator at the time an orange is really appreciated north of the Equator. In commercial importance the propagation of "Navel" oranges would seem likely to yield a much larger profit than any other variety possessing merit alone, provided that £ for £, acre for acre, and in the other factors of quantity, growth and freedom from disease, sun or wind, they are able to equalise with the results obtained from the selected seedling.

CHAPTER VII.

THE NAVEL ORANGES.

So far as concerns South African orange growing to-day, the "Navel" oranges may be said to comprise but two varieties, notwithstanding there are several other varieties named. These two are the Bahia, or old Cape Navel, or Nipple Orange, and the newer imported variety, the "Washington" Navel, and being by far the most notorious deserve some especial consideration as to why the latter has been (or both have been) such a miserable failure when "first-union" grafted on to unsuitable stocks, and grown on unsuitable soils with inadequate moisture. Firstly, there is once again the aspect of Root-rot as the disturbing element in causing the distribution of Seville and Pamplemous into areas where the lemon and seedling orange can only flourish. There is the further factor that the Navel orange will not flourish so well at "first-union" as it will do at "specialisation" with any stock, even if adequate moisture and suitable soil be provided it. There is the additional element that the best stock for an orange is a similar orange stock again with no other stock intervening. If the Bahia *were* "acclimatised" and in unison with our sweet seedling stock, it would at the present day be readily rehabitable to that stock, subject, however, to the extent of "mongrel inception" in the scions used for propagating; that is to say, according to the number of times the variety had been budded or grafted on to stocks, dissimilar to the seedling orange with which we are supposing it to have once been unified or specialised.

To make this plainer, if it once throve on the seedling orange, it will thrive thereon again, provided the "mongrelising influences" which it has absorbed by such "crossings" have been nullified or removed by re-training, with this difference, namely, that its "flavour-characteristic" may, or may not have been beneficially modified by such intervention.

Should a Navel type of orange be found growing to-day in South Africa upon a seedling orange stock, which seems to fill every theoretical and practical qualification and requirement of what a Navel orange ought to be, then it seems unnecessary to go outside of South Africa for a fresh supply of unmongrelised scions for our future propagation. Wherever a "Bahia" can be found growing freely and producing an abundance of high-grade fruit on the seedling orange stock, it may be grafted again on to another identical seedling stock, with the absolute certainty that equal growth will be established, and with similar abundancy of fruit, if a fruit graft be the propagating medium. It will, in fact, if anything, be even more permanently fixed and improved, if the soil factor is again identical with that from which it was taken.

The soil should again be identical, but the stock *must* be identical, and the vigour and health of *both* stocks as nearly as possible equal.

It is a golden rule in orange growing, to which there is no exception, that anything doing well on one stock, will do again as well (or better) on another similar stock, *provided always* that the influence of the stock, which is practically the sole factor in fruit quality, exerts its favourable and not prejudicial aspect on the fruit (*See* also Chap. XIII.) The influence of the soil is much less important when harmony or affinity prevails throughout, as will be found explained elsewhere.

The soil, as also diseases, which of themselves are trifles to a trained, healthy, "truly balanced" vigorous tree, mean inevitable death to an incompatible first-union. The seedling orange, or lemon, having had natural climatological training, will, by stock vigour, push on a first-union according to the more or less suitable characteristics it finds in the scion with which it can communicate its own desires, and identify its "man-made" life. These facts are inserted here in order that the causes of failures with Navel oranges may be better understood before a study is made of the *active* causes of failure which do not appear in this chapter.

The slight differentiation in the umbilical characteristic of the "Bahia" from that of the "Washington" may be said to lie as much with unequal rain-periods or frequent sun-hardenings, as from the dwarfing effects of unassimilable first-union stocks in the importing country. There seems, however, but little warrant for describing the "Bahia" or "Washington" as distinct types of oranges.

The "Washington Navel" Orange.

Taking as illustration the trifling loss of characteristic or of supposed affinity of the Bahia or Nipple orange in its behaviour with the seedling orange stock in this country, one can better estimate the importance of the immense confusion likely to follow an *imported* orange that to-day has been mongrelised by stocks, by soils, and by climates, like as has been experienced by no other orange since Adam was a boy.

The "Washington," as we know it to-day, has probably been budded or grafted on to every known grafting stock more than once, from each of which it has absorbed something than can only be considered in affiliation by the stock on which it now happens to be, proportionate to the common assimilator ruling citrus life as a whole.

Whilst it has adopted certain growth characteristics, such as distinguish a lemon from an orange, or from a pamplemous, not in conformity with its known need of specialisation, it cannot succeed on any specific stock until the constant unvarying influence of such stock shall, by nullifying mongrel inception, have gradually acquired full sway or specialisation by long and constant association therewith.

It has acquired certain common traits with the dominant assimilator in all stocks, but can flourish on none until specialised by the *favourable* influences derivable from the greatest amplitude of its best stock system, meaning in this instance, with that orange *stock* which shall of itself produce the highest grade of fruit. Being also a seedless orange, the potent craving for reproduction seems diverted from *seed* into fruit.

My impressions so far warrant the belief that if original, "Bahia" scions were available, it would be possible to improve upon them to such an extent as to warrant a new naming, and by pointing out to the distributing nurserymen the importance of continuing such specialisation, to do away with the present confusion surrounding citrus propagation. Beyond this the absolute recorded history of each experimental tree would lay the foundation for successful future fruit-culture.

With regard to its behaviour on the Seville stock, it speaks volumes for the vigour of the Washington "spark" that it still grows a little thereon until the test of adverse conditions proves too much for it.

To trace the origin of the scion or the tree one purchases is impossible, yet could such be obtained much might be gleaned by a careful observer to account for the many discrepancies constantly occurring.

In common with most other oranges of high quality, the "Navels" make bad "first-union" growths, with dissimilar stocks, the lemon excepted. They may be trained to specialise with any stock, but the fruit may have no commercial value. This aspect of the case will be found explained in the pages following.

To sum up the probabilities as to which is the best stock for "Navel" oranges the answer is already supplied, namely: "*As a non resistant stock*, the indigenous sweet seedling orange that shall of itself produce the highest-grade fruit in its own class, grown from seed, in suitable soil, on to which the Navel scion shall be grafted.

As a resistant stock the nearest possible approach to the former, namely, a Seville orange grown from Colonial seed on to which the Navel scion shall be grafted.

It should be understood here that these two replies do not comprehend the meaning of *specialisation;* it simply speaks as if "first-unions" would solve the matter, whereas if the question be put thus: What is the best stock for Navel oranges? the reply, in addition to the foregoing, should have these words added: "Such 'Navel' scion to be taken from a tree already growing vigorously, and fruiting well on such another identical orange stock, as that which it is now proposed to graft."

It would seem to lie outside my province to give a definite pronouncement with respect to the better orange of the two, because the opinion of one man is quite insufficient, unless it should happen that he combines the palate of the connoisseur with the business acumen of a wholesale fruiterer of long standing, but my suggestions would be that so far as concerns the immensity of the mongrel influences absorbed by the Washington Navel, it may be necessary to go outside of South Africa in order to start fair with this variety.*

It would further seem to be an economic measure, in view of its importance, for the Governments of the various South African Colonies to appoint a competent man to investigate and personally select such scions as would likely replace the orange industry on sound commercial lines.

In the event of a suitable tree being found in this country to forthwith acquire it by purchase, provided (a) that it is not an old tree re-grafted, (b) that the stock on to which it is declared to be grafted shall be proved by the growth of a cut off, partly pulled up root.

The object of this acquisition would be to propagate therefrom on the "Masters System" in the Government nurseries, if such be hereafter established. Which was the best orange could not be stated without a personal visit to Brazil, from whence the "Navels" possibly originated, seeing that all "acclimatising" (mis-called) must in the past absence of knowledge necessarily trend toward depreciation, rather than beneficial elevation or improvement.

CHAPTER VIII.

First-union Grafting.

This term, now submitted for the first time as a technical phrase in horticulture, implies the simple act performed by budding or grafting a scion on to another stock dissimilar to that from which it was cut, or on which it grew, *for the first time.*

Illustrations of First-union Grafting.—

(*a*) A seedling orange scion, grafted on to a lemon stock (for the first time) makes a "first-union" with the lemon.

(*b*) A lemon growing on a lemon stock, budded or grafted for the first time to a Seville—or any other stock except another identical lemon—becomes first-union with the Seville, etc.

(*c*) A "Navel" orange scion, hitherto growing on a seedling orange stock, becomes, when budded on to a Pamplemous or a lemon for the first time, a first-union with either.

(*d*) A scion growing on any particular stock, whether in full-bearing or only in the nursery, is called a "first-union" with any other stock the first time it shall become placed upon a different stock to that on which it is now growing.

---

* Mr. Lounsbury, the Cape Government Entomologist has, I believe, brought several grafted Bahia trees over with him from South America, and on the Seville stock.

(*e*) Every change from a stock on which any tree is thriving (such as, for instance, a seedling tree, or a scion and stock in true growth affinity) to another dissimilar stock, and back from the latter *to another identical stock as that from which it was taken*, is only considered a "first-union" to the intermedial stock.

(*f*) Thus: A "Bahia" orange growing on a Cape seedling stock, when budded on to a Pamplemous for the first time, is a "first-union" to the Pamplemous, but if, after it had grown large enough on this Pamplemous stock to cut a scion, a scion be cut from it and grafted again on to another Pamplemous stock, it is then a "*second-union*" with the Pamplemous stock; but if, instead of making this "second-union," we had placed the scion on to another identical Cape seedling orange, it would not be a "first-union" to it again unless it was *originally* a first-union therewith.

To make this quite plain:—

Of the "Bahia" orange now growing on the Cape seedling orange stock, we know about its past history nothing whatever. We see the simple fact that it is growing thereon, but from what tree the scion was cut, whether a "seedling" or a grafted tree, we cannot say. The probabilities would seem to indicate the "seedling orange" had been used perhaps several times if the growth was good, but there would be no foundation for the surmise, unless its record had been kept *and was known*. With no past record we can only "guess." Therefore, presuming it had been budded or grafted many times on to a "Cape seedling" stock, and was only first-union to the Pamplemous, it would not be a first-union again to the Cape seedling stock if we budded a scion from the Pamplemous-grown tree on to another identical Cape seedling orange stock. The probabilities of dissipating the influence this particular scion had inherited or absorbed from its first-union with the Pamplemous would depend upon the predominating stock factor* preceding that union.

For instance: If the scion had been placed once on a lemon stock, once on a Seville stock, once on a Pamplemous stock, and once on a seedling orange stock (all first-unions), it would be impossible to say which was the greater influence absorbed from these unions, unless we knew the primary ruling potentiality it had inherited from its specialised stock from whence we suppose it originated. As regards the growth-factor, its more or less affinity to one particular stock could only be inferred by knowing the particular habits of such stocks with such scions, uninfluenced by mongrelisation; but speaking in general terms, the most favourable growth results, relatively assessed, knowing the predisposition of an orange for an orange, would indicate its natural affinity thereto irrespective of fruit. It would thus be *supposed* to adapt itself again to the stock from which it originated *prior* to being placed once on the lemon, once on the Seville, etc., if soil conditions and rainfall were equal.

---

* Stock factor because the Bahia is seedless.

It can thus be readily understood that it we take a scion from a "Bahia" or "Washington" Navel, knowing nothing of its past history, nor of its natural affinity to a specialised stock, and we once more blindly place it on to a "seedling orange" to see if it will "do better on that," we form a conclusion that may be correct without knowing why, and forthwith determine that the "seedling orange," or the lemon, or whatever it may happen to be, is the proper stock.

Or again: We have a "Bahia" that refuses to grow on the seedling stock; we cannot tell why. We cut a scion and graft it on to a lemon, and if it grows vigorously forthwith we condemn the "seedling," and advocate the lemon stock. Yet had we examined the root (or the soil) of the seedling we might have found the stock could not grow, from an error in planting, or some simple defect overlooked. Estimates are thus formed correct or incorrect as they may happen to be often from one trial, and without a study of the determinate factors making for or against some specific object.

All stocks in the so-called "Citrus family" on to which a scion has been grafted exert more or less influence toward the fruit of the scion (the growth in a lesser degree) *proportionate to the number of times such scion shall have been grafted upon such stock, without any intermedial first-union with another dissimilar stock.* A scion, therefore, can only re-affiliate itself to its own particular specialised stock† proportionately to the training it has received from other stocks more or less usurping, occupying and supplanting the functions of its first or original specialisation. A "Bahia," re-grafted every ten years on to identical indigenous orange stocks one hundred times, totalling a period of one thousand years, could not absorb a hundred-power influence from its stock. If it thrives on its first-stock it will thrive on its second equally well, soil and climate being equal. The capacity of the stock to influence *fruit* is therefore limited to the amplitude of those innate characteristics which distinguish an orange from a lemon, etc.

There seems no reason to believe an orange stock can exert any material influence on an orange fruit, or growth, after a third to fifth union, but the reverse influence of the lemon stock on an orange fruit is distinctly noticeable to the trained palate with a simple first-union *if* BUDDED *on to a strong lemon stock previously cut down.*

An orange may be specialised to a lemon stock at a second to third union, and cannot become rehabilitated to the orange stock again without a reversal of the process, which is not necessarily prejudicial to the ultimate fruit produced by such rehabilitation.

---

† That is, if it ever had enjoyed speciality, so far as concerns this country.

Before detailing the effects of first-union grafting, a hypothetical illustration may make my meaning plainer.

If a particular orange, let us say again, the "Bahia," has been budded some twenty times constantly to the same identical kind of Cape seedling orange, it will have reached its highest state of combination or union with that stock; the fruit will have absorbed the extreme amount of the flavour such stock has been able to impart to it, and the standard of its growth will be regulated by the average vigour and continuity of sufficiency in growing-room, moisture, and assimilable plant food of past average conditions as the stock is able to supply its "man-made" partner. Thereafter (viewing this specialised graft as a training development made by the horticulturist, and not a naturally balanced creation as is a seedling, we must conclude that) if a scion be taken from such a tree, and a simple first-union be made on to a dissimilar stock with the additional disadvantage of dissimilar soil, it would be less fitted for such conditions than one which was nearer the natural *seed* order.*

We might thus reasonably expect such a production to behave in a sickly or eccentric manner, judged by past experience with "seedlings," etc.

If then this be understood it seems to my mind to account for the "breakage-confusion" of Root-rot, prior to which there was no necessity to use "resistant" stocks, or to depart from a recognised principle or practice then in vogue and satisfactory; and in the light of my own investigations this theory is substantiated in practice.

Thus it seems safe to infer that when we hear that the "Bahia" or "Washington" has been established in California and not in Florida, it resolves itself into the simple fact that the "stock system" of California, being less diverse and more continuous than that of Florida, had overcome the failures of "first-unionising" by unknowingly carrying the sequence on through the use of identical stock similar to that on which the "distributing tree" was grafted on its arrival. My investigations, although lamentably deficient, seem to warrant the belief that the Old World growers, equally with the New World and ourselves have all signally failed to make a success of first-union grafting from reasons previously given, and it was not until what I now term the "Masters System" had been fortuitously adopted that success was won.

Some effects of first-union.

The principal effects of "first-union" grafting viewed horticulturally, as well as commercially, may be defined as the acquisition of early bearing at the expense of wood-growth—a dwarf.

---

* I have actually killed a stock in eight months with an antithetical scion.

It often promotes irregular or biannual bearing.

The stock, desirous of exerting its own growth in order to live its full natural life frequently exerts bursts of energy originating low-down sprouting, which, if taken off, seem to but further retard (first-union) growth.

It may be said that the effects of first-union grafting have been to condemn good stocks in ignorance of the necessity there is for specialised continuance.

First-union grafting all on the same stock would seem to form a common ground-work or basis for the translerence of some peculiar attribute possessed in common by all. Thus a block of trees all first-union to lemon, containing Washington Navels, Paper-rinds, Naartjes, etc., will shew in many instances the umbilical characteristic of the Washington, and in fewer instances the paper-like rind of the St. Michael, seemingly suggestive of interchangeability by possessing something in common the one with the other (whether by stock and soil in conjunction with rains after droughts causing all to bloom together, I cannot say), whereby the characteristic of one is shewn on another fruit.

A common defect of first-union grafting on the lemon stock in conjunction with mongrelisation is the peculiar "freaks" manifested in the construction of the "Navels," often rendering them unsightly and unmarketable. It is seldom a lemon stock produces a true small inner orange. It mostly consists of a hard, pithy substance; the sections, also, are formed erratically. These defects are certainly no recommendation to the name distinguishing the variety, but I have never noticed the defects so excessive with the use of other stocks.

Split and bursted fruit is a common first-union defect, even when well shaded and sun and rain normal.

Deceitful first-unions.

As will be noticed under "Training," the nearer the root of the stock a first-union bud or graft is inserted, the less chance the stock has of asserting its own growth, and the greater possibility of compelling the scion to grow *wood*, whether in affinity or not. Such unions, if taken from young, vigorous-growing wood are deceitful, because, notwithstanding their apparent thrifty growth, they fail at a later stage under the stress of adversity equally with the more dwarf habit of the common first-union type. Apart from Root-rot factors, it may be said that *low-down* grafting or budding secures a more permanent form of growth than simple first-union budding or grafting a foot or more high, because in the former the root-juices cannot escape conversion; thus a healthy root and favourable climatic conditions together may cause such a tree to live for many years until some stress tests its vigour, and it succumbs.

In a general way it may be said that the more suckers or low-down sprouts a stock will throw out, the more chance its first-union graft has of maintaining its vigour, because the root is thereby "exercised" or "allowed its fling," but there is a stage of first-union grafting, promoted by the use of young, *straight* wood, when suckering does not occur and heavy wood growth takes its place This is the result of scion-influence in conjunction with stock-energy both developing together and assisted by seasonable rains

Abnormal growth is developed, but at the expense of health or strength, and trees of this style failing good "resting conditions" after a heavy crop never recover their strength

In a country where droughts or stress did not occur, such might have still borne bi-annually for long periods Many instances of bi-annualism occur with the Seville stock, particularly with a "Washington" above it, but in droughty areas it dies off from inability to recover or grow *wood.*

First-union failures

A tree naturally in perfect truth and due balance the branch with the root, and the sap with the fruit is supplied by the wisdom of the Creator in the seed, and not by man

When *man* attempts to improve or divert the forces of nature in order to serve his purpose, it must necessarily follow that a deviation from laws, of which he knows little, entails constant failure and experiment, until one or more of the fundamental rules governing the various factors concerned be understood and followed. Failing in this, the issue depends on chance, or in following the lead of another who has succeeded, yet knows not why. Some of the unwritten laws in the code of nature are gradually unfolding to science, whilst others seemingly from lack of some foundation whereon to speculate, defy investigation. Thus, for instance, in the relationship existent between scion and stock we occasionally find two fruits of entirely different appearance fraternising at first-union for which we can give no adequate reason We may infer that the lemon and Seville have something in common, or that such union indicates the presence of some common unmongrelised assimilator possessed in the scion and confirmed by the stock

When, however, we investigate the failures of first-union grafting by contrastive improvements as exhibited by second and third unions we are able by inverse deduction to affirm that if third-union improved upon second-union in the ratio that second-union improved upon first-union, then the relationship or affinity of *one first-union* is insufficient to permanently establish tree-vigour by disconnected budding or grafting.

Drought, as has been mentioned before, is the most frequent and the speediest cause of death, especially if preceded by soaking rains: nevertheless, the paramount cause of the inability to grow high-grade variations (named varieties) on unaltered stocks is because sufficient "specialisation" cannot be created by first-union grafting

Drought or Dry-rot Disease.

For some six years or more, in common with other growers in the districts surrounding this (Bathurst), I have noticed the roots of weakling seedlings of lemon, pamplemous and occasionally a weakling Seville, as well as larger numbers of first-union grafted trees, in the order, pamplemous, lemon, Seville, not to mention deciduous fruit-trees, having the appearance of a fungoid growth with the wood decayed like dry-rot in timber. The tap-root had decayed from the point upwards, and ending on the surface moisture line. The stem of the tree would have the ordinary mottlings of sun-burn or insufficient nourishment, and much dead wood would be apparent in the tree.

Several years' investigation convinced me that it could not be solely attributable to a mycological disease, although mycelium more frequently covered the roots of unthrifty deciduous trees than the roots of the affected citrus, for, whereas no really robust citrus or deciduous trees were apparently suffering, it seemed to select without exception the weaklings (quite irrespective of varieties) growing in deforested land that could not be deeply sub-soiled on account of stumps still in the sub-soil. Since that time I have had many opportunities of forming a definite opinion, as much from my own observations as from the hearsay of others, and I pronounce the primary cause of this "new-disease" to lie in the constitutional weakness of first-union grafting being insufficient to withstand some mycological disease present in rich or deforested land. A suitable name for the disease suggests itself—Drought (or dry) Rot, seeing that drought, although not the actual cause, is yet the active agent in producing death because first-unions have no vitality to resist adversity. If we examine the affected orchards we shall find that those trees whose scion had been outgrown by the stock sprouts, or whose scion had been knocked off and the stock had asserted its own vigorous growth, had escaped the disease, whilst those still struggling to maintain an unequal battle had succumbed, irrespective of sub-soiled ground or imperfect cultivation.

A tree requires moisture and growing-room in perpetuity to cause it to exercise what vigour it possesses, and the weaker its constitution the more the necessity becomes apparent to shield it against adverse conditions, whether it be a drought or a mycological disease, and unless "grafting" approaches more nearly the order of the healthy seedling, and the grower understands the reasons surrounding "weakness," he cannot prevent the death of the tree because it is, and always was, a weakling. It often happens that the seller of such a weakly-constituted tree, seeing it refuses to make "selling-growth," manures it with guano or something stronger, thus rendering it all the more inapt to stand stress. Nature's law, "the survival of the fittest," has many assistants, one being a mycological disease termed Drought-rot.

(To be continued).

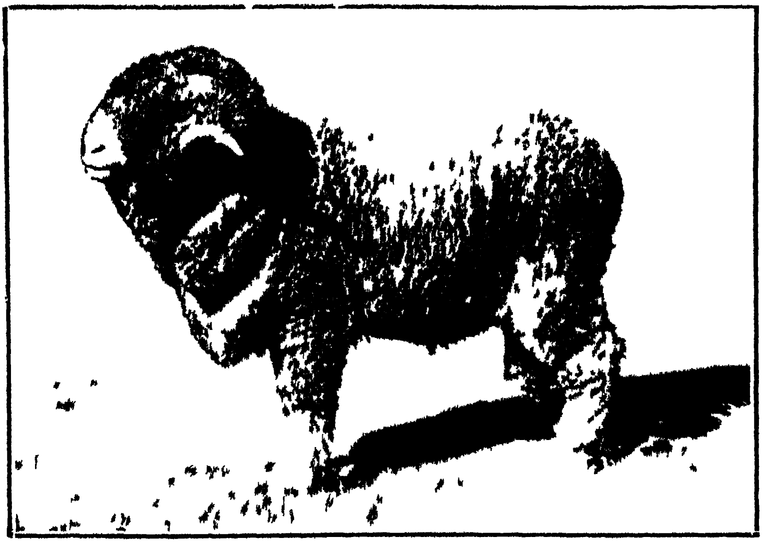
AMERICAN RAMBOUILLETS FOR SOUTH AFRICA.

Valuable Importations by the Hon. Dr. T. W. Smartt, M.L.A.

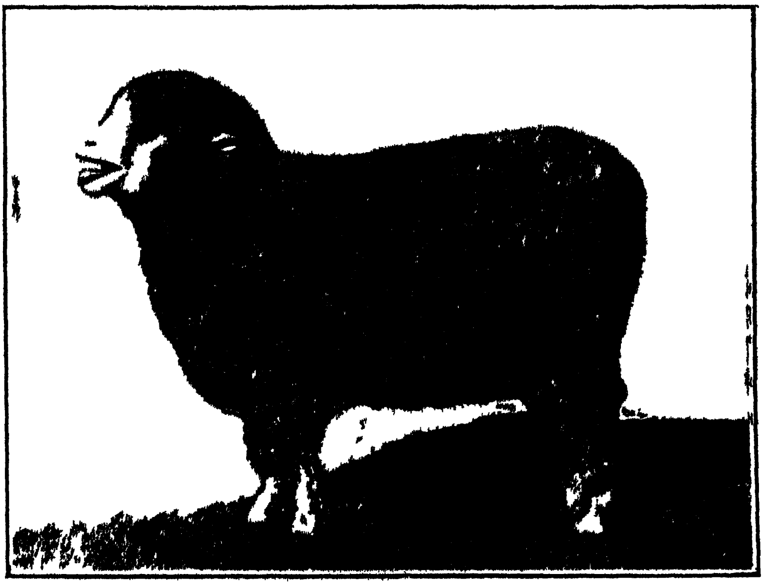
Among the very excellent pens of Merino sheep at the Rosebank Show were some which, though "for Exhibition Only," attracted the attention of all sheep lovers and kept them deeply interested for some considerable time. These were the pens containing the recent importations of Dr. T. W. Smartt for his farms in Britstown district. Dr. Smartt has always aimed at a type of sheep to suit his surroundings—which are sometimes very trying—and with this object still in view he has brought out this, his latest importation. For quality and general excellence these sheep must be given a high place, and more will undoubtedly be heard of them later. They are from the famous "Tucannon" Rambouillet flock, the proprietor of which is Mr. R. A. Jackson, of Dayton, Washington, U.S.A. The *American Sheep Breeder* has the following notes on these sheep:—

Mr. R. A. Jackson, proprietor of the famous "Tucannon" flock of Rambouillets at Dayton, Wash., has quite recently sold to Dr. T. W. Smartt, of Cape Town, South Africa, three rams and thirteen ewes. This sale of high-class sheep is a record-breaker in two instances. The ram "Tucannon," which Dr. Smartt secured at $500—the record price of the year for a Merino ram—and one of the ewes embraced in this collection, for which he paid $250, makes the record price for a Merino ewe. Mr. Jackson parted with these sheep with much reluctance, as they constitute a part of the cream of his flock, and the noted South African breeder is the fortunate beneficiary. The shipment is in charge of Shepherd John Moran, who exhibited at the International on his way to New York, from which port the sheep go by steamship to Cape Town. This now memorable purchase embraces three rams, including the two-year-old ram, "Tucannon," one yearling and one ram lamb. The thirteen ewes are mostly pure Von Homeyer blood and sired by "Jumbo." In this lot of ewes is the first prize ewe of the World's Fair at St. Louis, and two others that won many firsts and seconds on the Pacific Coast circuit this year, together with a prize winning ewe lamb on the Coast circuit.

The ram "Tucannon," who won third place at the International, is a two-year-old pure Von Homeyer and a wonderful sheep in many



Dr Smartt's American Rambouillets
The two year old Ram



Dr Smartt's American Rambouillets
A full grown Ewe, taken broadside

Dr Smartt's American Rambouillets

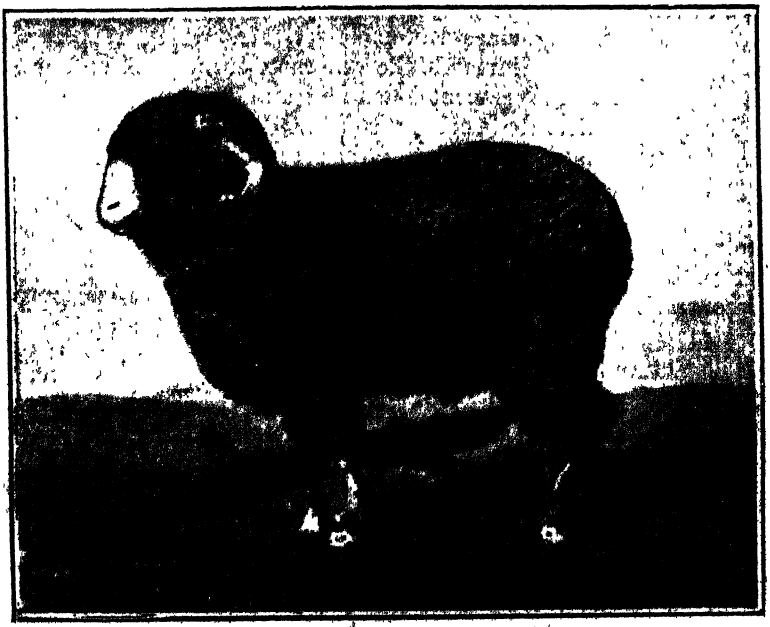
A full grown Ewe, photographed from in front.

Dr Smartt's American Rambouillets.

Group of young Ewes

His massive head, shoulders and beautifully folded front; his large frame and heavy bone and all close to the ground; his nice large feet and straight standing on them; his wool abounding in free flowing oil and beautiful crimp, make up a personality rarely equalled in Rambouillet flocks. This great ram weighed 275 pounds at the International, and Mr. Moran says he sheared 35 pounds of 15 months' growth of wool.

No. 24, that stood second at the International in two-year-old ewe class, was out of Jackson's great sire "Jumbo," one of the strongest breeders in the United States. This ewe has a form typical of the best Shropshire and the covering and character of the best Rambouillet fleece. She is straight of back, has a short, thick neck and a beautiful head, is very broad between the ears and eyes and has a pink skin and soft, velvety nose.



Dr. Smartt's American Rambouillets.

A ten months' old Ram.

Eleven other ewes, all sired by the great ram "Jumbo," shew the same strong individuality the show ewe has of the Von Homeyer type. This regal flock of sheep, which are just now leaving the country, were all bred and raised by the seller, and presumably surpass anything of the breed yet shipped to South Africa.

VINE MILDEW OR PERONOSPORA.

By C. P. Lounsbury, Government Entomologist.

The destructive vine fungus known as Mildew or Peronospora (*Plasmopara viticola*), heretofore unknown in South Africa, was discovered late in January to be present at Grahamstown. The attention of the Eastern Province Entomologist, Mr. W. R. Dewar, was directed to it by Mr. E. Tidmarsh, the venerable curator of the Botanic Gardens. The Cape Government is without an official mycologist, and hence Mr. Dewar submitted specimens of the disease to Mr. I. B. Pole Evans, the plant disease specialist of the Transvaal. Mr. Pole Evans identified the trouble as the above named, and has since announced that there is absolutely no doubt in regard to the correctness of his determination. How the disease got to Grahamstown is not known, and at present the Department has not the slightest clue. So far as is known, no one in the place has introduced grape vines from any over-sea place, regulations to prevent such introductions having been in force about twenty years; of late years not even allied plants, such as Virginia creeper, have been allowed to enter. The town is not a grape-growing centre, so there is little temptation to anyone there to transgress the regulations. A hasty inspection has shewn that the disease occurs all over the town, and it is not known from what part it spread. Some farms a few miles away appear to be still free of it. Mr. Tidmarsh seems to think it quite new to his part of the town, particularly as it has considerably affected a vine at his residence which resists the common diseases, and which has heretofore appeared clean. On the other hand, Messrs. W. and C. Gowie, the well-known nurserymen of the town, incline to believe the trouble to be a long-established one, which up to now they have failed to distinguish from the common diseases—oidium and anthracnose. It chances that at Grahamstown the weather conditions this season have been unusually favourable for the development of fungous diseases, and Messrs. Gowie are of the opinion that this circumstance explains why the disease has been noticed this year by parties who failed to detect it in previous seasons.

Immediately on learning of the existence of the disease, the Department had a hurried inspection made of representative vineyards and vine nurseries in Constantia, Paarl, Graaff Reinet, Uitenhage, Cradock, Queenstown, and King William's Town, without, as already intimated, anywhere finding it. If it were widely established at any of the places, it would probably have been found, as almost everywhere oidium and anthracnose were very much in evidence. The general distribution of the disease over Grahamstown, however, makes it very probable that it has been present there more than one season already, and there is much reason to fear that it has unwittingly been sent with vines for planting far and wide throughout South Africa, and that it is by this time too thoroughly established to admit of any chance of eradication. Very few vines have been sold to any one party of late years by Grahamstown nurserymen, but many small orders have been filled, and one vine might serve to introduce and establish the infection as effectively as a thousand. A list of the persons to whom vines were supplied by the chief nursery has been obtained, and steps are being taken to ascertain from them if these vines have manifested the disease.

As the name indicates, the affected vines take on a mildewed appearance. The under surface of the leaves becomes affected in large blotches, and the mildew-like growth is rapidly followed by the drying out of the part and the curling of the leaf at the edges. The foliage finally looks as if scorched. The berries become brown in spots, and later assume a frosted appearance from the grey threads of the fungus, or they may quickly wither and possibly fall through the stems being attacked. The disease may develop with extreme rapidity, and vines which look healthy one day appear badly affected on the next. Anthracnose, which causes black spots on the berries and foliage, and deep charred-like spots edged with black on the wood, and oidium which checks the growth of the shoots, forms a slight mildew that easily rubs off, and minutely speckles and cracks the berries, are quite distinct diseases long known in the country.

The disease is of American origin, and was introduced into Europe about thirty years ago. Though one of the worst, if not the worst, of the vine diseases, it can be controlled by timely spraying. It seems to develop more seriously in cool vine-growing countries than in the more sub-tropical ones. The climatic conditions would be so much against it in most parts of the south-western vine districts that it would not likely become a trouble of much importance in them; but in the Cape Division and in many of the more humid valleys and kloofs in the winter rainfall area, it might prove of serious importance in many seasons.

The Government quarantined all vines in Grahamstown nurseries as soon as the disease was recognized, and without delay issued a Proclamation forbidding the removal of vines and grapes from the Albany Division. The nurserymen concerned have applied remedies to check the disease pending more drastic action, and it is probable that the Government will arrange to have all vines growing on their premises rooted out and burned. A suggestion to destroy all the vines in Grahamstown is under consideration, but the outcome of the enquiries to determine on the presence or otherwise of the disease elsewhere will probably be awaited bfore a decision is reached. There are no large vineyards, but a few vines are grown for fruit or ornament in a large number of private gardens throughout the town. Plants other than those of the vine family are extremely unlikely to establish the disease in other localities, so the public need have no hesitation in continuing to patronize Grahamstown nurserymen.

YELLOW LIVER, OR CONGENITAL FUNCTIONAL DEBILITY IN OSTRICH CHICKS.

By D. HUTCHEON, Director of Agriculture.

With the exception of animal parasites which infest ostriches of all ages, but more particularly young growing birds, the principal disease affecting ostriches is what is known as "Yellow Liver," which is very prevalent at times amongst young chicks from one to six months old, and the mortality arising from it is often very high.

Nature of the Disease.—It is a form of atrophy of the liver, with fatty degeneration of its cells. On opening an affected bird immediately after death, the liver presents a slightly variable yellow colour, and is soft and flabby to the touch; on making a section through it with a knife, the cut surface presents a uniform smooth appearance, and not the slightly granular surface natural to a healthy liver.

The abdominal and thoracic cavities generally contain a variable quantity of a clear serous fluid, the muscular tissue is pale and flabby, and the blood contained in the heart and larger blood-vessels is lighter in colour, and more watery-looking than natural. In fact, the whole of the appearances indicate that the chick died from *anaemia*, the whole of the tissues being improperly nourished, although the bird may have been supplied with a liberal quantity of food; in fact, the stomach is generally found distended with food.

Before, proceeding further it is necessary to explain that the yellow colour of the liver is not directly due to diseased action. The natural colour of the liver of all ostrich chicks that I have examined shortly after they were hatched, is yellow; and this appearance of the liver is not peculiar to ostrich chicks, as the livers of all newly-hatched birds that I have examined present the same colour. This is due to the fact that it is from the yellow yolk that the embryo chick derives its nourishment during the period of incubation, and for one or two days after.

"The yolk-bag is the first formed, and the body of the embryo becomes in great measure detached from it. It contains, however, the greater part of the substance of the yolk, and furnishes a source whence nutriment is derived for the embryo. This nutriment is absorbed by the numerous vessels which ramify in the walls of the yolk-sac." (Huxley.) As the yolk-sac is emptied, it is gradually drawn into the abdomen through the umbilical or navel opening, which then closes over it. In some instances the remains of this sac are found protruding through the navel opening after the chick has left the shell.

The Cause of the Disease.—Many theories have been advanced to explain the cause of this peculiar disease of young chicks, amongst which may be mentioned irregularities in feeding the chicks, and want of proper exercise. It has been considered by some to be a special disease of the nature of typhus fever, while others attribute it to undue exposure of the chicks causing congestion of the lungs and other internal organs. A large number of experienced farmers ascribe the disease to artificial incubation, and the forcing of the parent birds to lay an undue quantity of eggs. With respect to irregularities in the feeding of the young chicks, and the want of healthy exercise, I have little doubt that the habit of cooping up young chicks in a very small space, and stuffing them full of green food while preventing them from obtaining sufficient exercise, would tend to distend and enfeeble their stomachs, more particularly if they were naturally weak, and produce acute indigestion with its accompanying train of evils, such as interference with the free circulation of the blood through the blood-vessels leading to the heart, followed by dropsy, etc. Farmers, as a rule, make the mistake of trying to force food on a delicate stomach, forgetting that although a healthy stomach can stand gorging with comparative impunity, a delicate organ requires to be fed sparingly.

But although this form of mismanagement has been the cause of the death of many healthy chicks, and of many more delicate ones, it is not the principal cause of this particular disease, for chicks have continued to die from yellow liver under all systems of feeding and management, even when allowed to remain with the parent birds on the veld, although a larger percentage of delicate birds can be reared by that method than by any other.

With respect to congestion and inflammation of the lungs, induced through neglect to provide proper comfort for the young chicks immediately after being taken from the nest, or the incubator, or from exposure to cold rain, etc., at a subsequent period, a good many chicks are carried off from these causes during the winter and spring months. But although many chicks die from neglect or mismanagement of such a character, more especially if they are constitutionally deficient in stamina, yet the losses from these causes are small in comparison to those arising from yellow liver.

With respect to special diseases, I have not myself seen any cases of either typhus or typhoid fever amongst ostriches, but I have seen an affection of the throat very closely resembling diphtheria, which attacked several broods of chicks in the Western districts, but it was confined to a limited area, and did not spread. It has no relation, however, to yellow liver.

With respect to artificial incubation, there is no reason why chicks which are hatched by means of the incubator should not be as strong and healthy as those brought out by the natural process, provided that the incubator is properly constructed and carefully regulated. Where, however, the incubator is defective, or lack of skill or care exercised in its management, the health and vigour of the chicks so hatched may be seriously affected. But even if we admit the deteriorating influences likely to arise through errors in the process of artificial incubation, that alone would not account for the widespread prevalence of this disease which frequently occurs, and the heavy mortality which arises from it. But although artificial incubation may not be the direct cause of this affection in the chicks, may it not be the indirect cause? By removing the eggs from the nest to be hatched in the incubator, the breeding birds are induced to continue to lay during the whole season, thereby producing two, three, or even four times the number of eggs which they would naturally lay; and if this forcing system is pursued year after year, it must tend to exhaust the parent birds, and thereby seriously impair the constitution of their progeny. I readily admit that by domestication and artificial feeding, the functional activity of the generative organs of the breeding birds may be considerably increased, providing that all the conditions which are essential to maintaining the healthy vigour of the animal body are supplied, principal amongst these being an abundance of suitable food and healthy exercise. The question is whether the breeding birds which are forced in this manner are, as a rule, kept under such favourable conditions, and supplied with the quantity and quality of food necessary to maintain them in a healthy, vigorous condition? I am afraid that the answer, in a large proportion of cases, must be in the negative. For, although the majority of experienced ostrich farmers no longer keep their breeding birds cooped up in camps, in which there is usually very little natural herbage of any kind for them to feed upon, nearly the whole of their food having to be supplied artificially, yet even at the present time large numbers of breeding birds are very insufficiently fed for long periods, and the artificial food usually supplied under such conditions is not alone deficient in quantity, but its quality is not always the best adapted for maintaining breeding birds in a healthy, vigorous condition.

In the absence, therefore, of any direct evidence as yet discovered of the presence of a special disease, I am strongly of opinion that the so-called yellow liver of ostrich chicks is due more to congenital functional debility, more particularly of the liver and digestive organs, than to any specific infectious disease, and that its origin and cause must be sought for in the feeding and management of the parent birds. In fact, it bears a very close resemblance to that affection of the stomach of young lambs known by the name of bloodpens, which is prevalent in certain seasons.

If this opinion is correct, the remedy will be obvious, although it may not in all cases be so easy of application. I am perfectly well aware that on many farms, more especialy during periods of protracted drought, it is a most difficult and expensive matter to provide a sufficient quantity of suitable food to supplement the deficiency on the veld, still it is equally true that Nature will not relax her demands because we are not in a position to comply with them. It is no use, therefore, to look around in search of some panacea to avert the consequences of our neglect or inability to comply with nature's requirements. Medicines of a suitable character, especially such as supply the deficiency of certain mineral constituents in the food, as salts of soda, potash, sulphur and lime, more particularly the phosphate, are very beneficial; but although these substances undoubtedly benefit the constitution by supplementing the mineral deficiencies in the food, it must be clearly understood that, valuable as they are, such substances are not food, and cannot be made to act as a substitute for it.

Treatment.—The curative treatment of yellow liver in ostrich chicks has not been very satisfactory hitherto. The principal aim should be to limit the quantity of food allowed to these delicate chicks, so as not to over-tax their weak stomachs, and to allow them plenty of healthy exercise; in fact, as already remarked, a larger proportion manage to struggle through the critical period by being turned adrift on the veld, and compelled to forage for themselves, than by nursing and feeding them at home. Still a laxative diet is undoubtedly indicated, and green succulent food is the best for that purpose. They should, however, be allowed only very little at a time to keep their appetites keen, and never satiated.

THE CARE OF MILK AT FARMS.

By R. SILVA-JONES, Government Dairy Expert.

Milk is the secretion of the mammary glands of the female mammal, the chief constituents of which are water, fat, albuminoid matter or casein, milk sugar and mineral matter. The proportionate percentages of these constituents vary most considerably from many causes, the chief of which are: Breed, age, lactation, food and general treatment, and in this short article I shall endeavour to treat with the milk after it has been taken from the cow rather than to discuss the theories and practices of the treatment of the cow to induce milk production.

The peculiar constitution of milk renders it most liable to many defects, and being a complete food in itself makes it a perfect home for all descriptions of bacteria, some of which will in their turn aid the dairyman to a successful issue, while others again may seriously endanger the value of such milk, whether sold as milk or whether it is made into butter or cheese. All articles that are manufactured from milk owe their proper tastes, flavours and keeping qualities to some description or colony of these bacteria, and I may say that not one of the favourable classes of bacteria can be produced under any other circumstances than absolute cleanliness. Carelessness and dirt are responsible for all bacteria that promote deterioration and decomposition.

The first to be mentioned amongst the defects which will tend to reduce the value of milk is careless and unclean milking, the absorption by milk of odours and taints emanating from dirty surroundings in the kraal and dairy, from injudicious feeding of strong smelling and tasting, and partly decomposed foods, also to the using of milk from cows that are not in a healthy condition, cattle under medicinal treatment, and suffering from sore udders. It must be borne in mind that milk most readily absorbs any smell or taint from other substances in close proximity to where the milk is standing, so that every care should be taken to see that milk and cream should always be kept in a clean, sweet atmosphere, where it is impossible for the milk to absorb any foreign smells. This class of taint, except those that are derived from any physical defect of the cow, can, as a rule, be controlled.

Milk taints can, generally speaking, be divided into two classes. Firstly those derived from food, and secondly those derived from contamination. The food flavours can be eliminated from milk by judicious treatment, chiefly by a change in food, discarding those that cause the flavour; and secondly, where that is not possible, by aeration of the milk immediately it is taken from the cow. To carry out this system of aeration, and I am fully convinced that all milk, most especially milk for milk-selling and for cheese-making, should be aerated immediately it is milked at all farms, both morning and evening in the summer and winter; not only will this system improve the delicate flavour of the milk, but the keeping qualities of such milk will be greatly improved, and in the case of milk for cheese-making the maker receives a pure milk over which he has a far greater control than otherwise. In the case of milk for butter one cannot aerate and cool the fresh milk, as for perfect separation the temperature is required to be as near blood heat as possible; but aerate and cool the cream passing from the machine; it can run over an aerator which will serve identically the same purpose. The process is simplicity itself, and can be carried out on every farm without extra work or trouble. In order to carry out this process of aeration, all that is required is an aerator, or as more generally called, a refrigerator. These are made in two forms, flat or cylindrical in shape, the two forms giving excellent results. The flat in some cases is better, as it takes up less room. The process is simply that of the warm milk passing over, in a very thin layer, tubes containing running water. The milk passing over these cold tubes in the thin layers is cooled suddenly, which throws off the heat and taints. Where water is not obtainable, it should be used without, but naturally where a supply of water can be led on in pipes to the aerator, the result of the aerator is infinitely better, and the cooler the water the more sucessful will it be. When fixing up the aerator, always remember to fix the inlet water pipe at the bottom, and allow the overflow from the top pipe; by this method the milk is always running down to the coolest water and is at its coolest when it leaves the machine. This process at the same time will check the formation of the lactic acid germs which are responsible for the souring of milk. Care must always be taken that the aerator stands in a perfectly clean and pure atmosphere or the desired effect of aeration will be defeated.

The contamination flavours are certainly far more easily controlled than the food flavours and are overcome by the removal of the cause. The principal trouble with these contamination flavours is from bacterial infection, and is due to milk absorbing strong flavours from surrounding substances, such as want of cleanliness in connection with the milking utensils and general treatment. By this it will readily be seen how very detrimental it is for the dairy to be used as a general store room, as is so often the case, and what is most dangerous and harmful in connection with so many of our dairies is the mud floor. Water and milk become spilt thereon, turn sour, and consequently hold a continuous bad smell and odour in the dairy, and become the breeding ground for bacteria of a most harmful character to good dairy work. These mud floors in the dairy are very bad indeed, are a constant source of danger, and give off a constant supply of contaminating germs.

In order to avoid this source of bacterial contamination considerable improvement is required in the system of milking. In place of the natives being allowed to milk with fingers moistened in the milk itself, a farmer should try and induce, if not to force, his servants to milk with the thumb and forefingers, the difficulty of such a change I quite recognise, but it is not insurmountable. This method would, I feel certain, free the milk of a certain amount of contamination, and would do away to a great degree with the sore teat trouble. Milking, as it is done in the open air, certainly has its advantages, especially where the calves are allowed to drink, but even here it would help most considerably if this system of milking were tried and the teats wiped dry after the calf had been allowed to drink sufficient to induce the cow to let down her milk

Immediately the milking of each cow is finished, the milk should be carried away to a convenient sheltered place, and every bucket or vessel receiving the milk should be covered with a covering of flannel, preferably a double cover. This acts splendidly for a strainer, and at the same time prevents dust from being blown into the milk. Kraal dung and dust has a most deleterious effect on milk, especially that used for cheese-making.

The buckets and tinware used in the dairy form a most important part in the output, as I have often seen very considerable contamination derived from this source. Farmers are as a rule not sufficiently careful to see what class of bucket is used. Circumstances generally tend to the purchase of a cheap article, but in the end this is, I think, false economy. In these buckets you often find interstices which it is almost impossible to clean. The sour coagulated milk lies there and cannot be got at, and is consequently always contaminating the fresh milk. All dairy utensils should be made of block metal with as few joins as possible. These are certainly a little more expensive, and it is for this reason, I think, that they are not more generally used; but the extra cost will repay itself tenfold in the more pure article produced, and they will also last much longer.

Badly made and rusty utensils are without doubt responsible for a large amount of bad flavoured milk and butter, and should be discarded at once. The cans, or a great majority of the cans, that one sees used upon the railways for the transport of milk to towns, and cream to creameries by the farmers, are not fit for the purpose they are put to, and if owners were to examine them carefully they would see for themselves how unfit they are. Cans with the small, narrow opening on top of a cone-shaped neck are very hard to clean properly, unless one has steam, which is seldom or hardly ever the case. This shaped can should not be used, more especially as cans of a suitable construction can be just as easily procured. The shaped can to be used for milk is the one that is straight-sided from the bottom to the neck, being narrower at the neck than at the bottom; it is so easy to clean and to see if it is clean or not, far more easy to drain after cleaning, and more preferable in every sense. For cream, which has a thicker consistency and is consequently harder to get out, the most suitable shape is that perfectly straight-sided, the same width at the top as at the bottom, fitted with about a five-inch telescoping lid, and the bottom about two inches off the ground. Very excellent cans of this description are now being made in the Colony, and I strongly recommend their use. Where steam is not procurable, the cans should be stood in the sun during the day to purify, the longer the better. Cans should always be rinsed in cold water to get the milk off before being washed in hot water, and a brush should always be used in preference to a cloth to clean them. Don't attempt to wash too many cans in one lot of water.

Another serious source of contamination is the imperfectly washed separator, and often I have seen, though a separator bowl is well washed, it is immediately put together again ready for the next separation, without giving the parts time to dry off and sweeten. One has only to smell the bowl of the separator after it has been put together for some time to see that it is not a correct proceeding. The bowl or the parts of it must lie open exposed to the air until such times as it is required for work. Remember that pure air is the best friend to a dairyman, and it should be made the best use of. It costs nothing.

It is these little defects, apparently small in themselves, which play a most important part in the industry. They often cause a great deal of trouble and unevenness in the output and consequent complaint from the purchaser and consumer, which the producer is so often at his wits' end to account for.

In conclusion, I cannot too strongly emphasise the necessity of thorough cooling and aeration of milk immediately after milking, no matter for what purpose the milk is used, in a pure, clean atmosphere. The benefits to be derived are immense, and where such system is carried out the improved quality of the output will shew itself at once.

THE FLIGHTLESS BIRDS OF THE WORLD.

By F. W. FitzSimons, F.Z.S., F.R.M.S., Etc.

(Director Port Elizabeth Museum.)

The Southern Ostrich—(*Struthio australis.*)

The Southern Ostrich, which is the variety now bred throughout the Cape Colony, is a different species to the three or four species of ostriches inhabiting the northern parts of Africa. The difference, however, is very slight, caused, doubtless, by the climatic conditions. Formerly in a wild state, it roamed over the dry and open districts of South Africa south of the Zambezi. Owing to incessant persecution by hunters who coveted its plumes, it was thought at one time that it would soon be quite exterminated. The Bushmen of old hunted the wild ostrich at all seasons, both for its flesh and plumes, stealing upon it unawares; lying concealed near its nest; or covering themselves with the prepared skins of dead ostriches, they would slowly approach, imitating the movements of the ostriches as much as possible, and when within shooting distance would discharge their poisoned arrows with deadly effect.

It is thought by many that the Southern Ostrich is now extinct in a wild state; this is not so; there are still small flocks of them to be seen in the Kalahari desert, Mashonaland, the Eastern Transvaal, and the adjacent Portuguese territory.

About the year 1857 a few progressive and enterprising farmers in various parts of the Colony succeeded in capturing some young ostriches, and the attempt was made to domesticate and rear them. This experimenting went on for some years, and in spite of the adverse opinions of experienced hunters, travellers and other so-called experts, these good old pioneer farmers not only succeeded in breeding the ostriches, but completely domesticated them, and from being the most timid and shyest of birds, they were rendered as tame as barnyard fowls.

In 1865 the census of the Colony records that there were 80 live domesticated ostriches throughout the Colony. The export of feathers was 17,522 lbs., valued at £65,736.

Of these only 120 lbs., however, was from the 80 tamed ostriches, the rest were procured from wild birds.

In these early days the greatest difficulty was experienced in breeding the birds, as the only means was to allow the hen birds to incubate the eggs, consequently the young birds turned out more or less wild and intractable. However, in the year 1869 the Hon. A. Douglass, of Albany, constructed an incubator by which the eggs could be hatched artificially in quantities, thus clearing away the greatest stumbling block to the development of the industry. Artificial breeding also meant artificial rearing, and thus the birds grew up tame and docile.

In the year 1875 the census of the stock in the Colony recorded 21,751 domesticated ostriches. In the year 1880 the feathers exported weighed 163,065 lbs., valued at £883,632. At this time a good pair of ostriches fetched about £200 the pair, and £10 each for new born chicks. Naturally these phenomenal prices caused large numbers of people to take up ostrich farming, with the result of a great fall in prices.

In 1882, the weight of feathers exported scaled 253,954 lbs., valued at £1,093,989.

In 1886 the price of feathers went down with a run, and although 288,568 lbs. of feathers were exported, the declared value amounted to only £546,230, being about half less the former value. During the year 1890 the value of feathers again rose, and has remained fairly steady ever since, the future being very rosy indeed, owing to the strenuous efforts of Societies for the Prevention of Cruelty to Animals in discouraging ladies from wearing the plumage of birds which have purposely been destroyed in order to obtain their feathers. In consequence of this, the demand for ostrich feathers among the feminine sex throughout the Western World is becoming increasingly great, and even at the present the demand exceeds the supply In the near future there is without question good times for those engaged in the ostrich feather industry. Greater efforts I consider should be made to infuse new blood among the domesticated ostriches by introducing wild ostriches from Northern Africa, and endeavouring to obtain and incubate the eggs, or capture the chicks of those still running wild south of the Zambezi.

It is needless to dwell upon the breeding and other habits of the ostrich, as they are generally known amongst Colonists.

THE RHEA OR AMERICAN OSTRICH.—(*Rhea americana.*)

South America is the home of a variety of ostrich called the Rhea. It belongs to the family *Rheidae*, and differs from the African ostrich in having three toes tipped with claws instead of nails, the absence of a tail, and a feathered head. The shape and construction of the plumage is also somewhat different to that of the African ostrich.

The sexes are very similar in coloration, the female being of a slightly paler grey than the male.

There are three kinds of Rheas, the other two are called Darwin's Rhea (*Rhea darwini*), found in Eastern Patagonia, and the Long-Billed Rhea (*Rhea macrorhyncha*), of Northern Brazil.

Fossil remains of Rheas have frequently been discovered in South America, testifying to the ancient origin of this bird.

The Rhea is polygamous, there being usually from four to about a dozen hens to each cock. Naturally, before the cock can take on a husband's duties, he has much fighting to do with other competitors, but once the victory is gained he keeps a wary eye on all other cocks to see that they do not approach near enough to make love to his wives. After the breeding season, however, the Rheas associate promiscuously in large flocks of fifty to seventy or so. The ashy-grey hue of the Rhea's plumage blends well with the surroundings, and when alarmed they make off at a speed not much inferior to that of the ostrich, and there being little contrast between the plumage and the surroundings, they are quickly lost sight of. When running they have a strange habit of holding one wing outstretched over the back, possibly to act the part of a steering apparatus. Like the ostrich, they are fond of bathing during the warm season, standing submerged up to the neck. They will often launch themselves out into deep water and swim with the body almost entirely submerged.

The cock birds seem to do all the incubating, and as far as is known, the hen takes no part at all. The eggs are laid in a hollow in the ground similar to the ostrich, and the number of eggs varies from about a dozen to thirty or more. It is evident that all the females under the patronage of any single cock deposit their eggs in the same nest. Frequently they lay their eggs anywhere at random. One traveller during a day's journey picked up sixty-four, which he found singly. Eggs laid in this way are not incubated.

The eggs are about one-third smaller than those of the ostrich, and are of a pale green colour, which rapidly fades on exposure to light. The cry of the male is somewhat similar to that of the ostrich, but it is accompanied with a peculiar sighing kind of sound.

THE CASSOWARY.

The Cassowaries are another family of flightless birds, closely related to the Ostriches and Rheas. They are inhabitants of New Guinea, Australia and adjacent islands. Their main distinguishing feature is the bald head and the bony crest or prominence on the top of the skull, and the bare, brilliant-hued neck.

The plumage is dark-coloured, and has a glossy sheen; the feathers lie upon the body very loosely, and have a peculiar hairy look. The only outward indications of wings are about five black quills quite devoid of any barbs.

There are nine species of Cassowaries which are named as follows: The Ceram Cassowary (*Casuarius galeatus*), the Australian Cassowary (*Casuarius australis*), Beccaris Cassowary (*Casuarius beccarrii*), the Two-wattled Cassowary (*Casuarius bicarunculatus*), Single-wattled Cassowary (*Casuarius uniappendiculatus*), Papuan Cassowary (*Casuarius papuanus*) Westerman's Cassowary (*C. westermanni*), the Painted Cassowary (*C. picticollis*), and Bennett's Cassowary (*C. bennetti*).

The Cassowaries, unlike the Ostriches and Rheas, love wooded country. In Australia they are principally found in the wild, rocky, and densely wooded districts. On being alarmed they dart into the thick bush and make off at a great speed, and penetrate the thickest bush, where no human foe can penetrate.

Ostriches kick forwards and downward; Emeus in an outward and backward direction; the Cassowaries kick forward somewhat like the ostrich.

Like the Rheas, the cock Cassowaries incubate the eggs, which are usually five in number, being the production of one female, these birds being monogamous, that is, they only have one mate. The eggs are about one-third smaller than ostrich eggs and are of a beautiful dark green, which fades after exposure for a few days to light.

The largest species of Cassowaries stand about five feet high. They feed largely upon fruits picked either from the trees or gathered from the ground after they fall when over-ripe.

THE EMEU.

The Emeu in general appearance is very similar to the Cassowary, but differs in the absence of the helmet, having a feathered neck and a broader bill.

There are two species of Emeus, the Common Emeu (*Dromoeus novoe-hollandioe*) inhabiting Eastern Australia, and the Spotted Emeu (*Dromoeus irroratus*), of Western Australia. They are about the bulk of a rather under-sized ostrich. Fossil remains of Emeus have been discovered in Australia

Formerly the Emeu was exceedingly abundant in Australia, but since the colonization of that country it has progressively diminished in numbers until, at the present time it is only to be found in the far interior where man seldom penetrates.

They are similar to the ostrich in their general habits, preferring the open plains to the dense forests. They are exceedingly fleet of foot, and can outrun most racing dogs. The cock Emeu is content with one wife, and when she deposits her nest of eggs, which vary from eight to about thirteen, he takes charge, and does all the incubating. The nest is only a small hollow in the ground like that of the ostrich. The eggs are usually of a dark green colour, sometimes bluish green.

The hen Emeu is the larger of the two, being taller, more robust, and better developed generally, and is more aggressive and courageous than the cock, so she consequently makes him do all the wifely duties. These birds are easily domesticated, and make excellent pets. There are many to be seen in the various Zoological Gardens.

In St. George's Park, in Port Elizabeth, there is a very fine specimen. These birds can inflict heavy blows with their powerful legs. They kick outwards and backwards.

In the Pliocene formation of rocks in Northern India, the fossil remains of a three-toed flightless bird, which closely resembles the Emeu, has been discovered, which shews that in pre-historic times such birds inhabited India.

The Kiwi or Apteryx.

The Kiwi is a remarkable looking bird, having no external traces of wings at all. It has a stout, robust-looking body and sturdy legs.

These birds differ from all others of the flightless bird family in having a long, slender bill, four toes to each foot, and their small size. There are four species of Kiwis, all of which are inhabitants of New Zealand. They are named as follows: The South Island Kiwi (*Apteryx australis*), North Island Kiwi (*Apteryx mantelli*), The Little Grey Kiwi (*Apteryx oweni*), and the Large Grey Kiwi (*Apteryx haasti*).

Their haunts are the districts which are thickly covered with undergrowth, particularly the vicinity of marshes and watercourses. Their diet mainly consists of earthworms and other creatures found in mud, which they grub up with their long bills. It is interesting to watch the careful manner in which a Kiwi will extract a worm from its hole without breaking it. The worm is seized and gently coaxed out of the hole by keeping its body taut, and gently moving it to and fro. When alarmed, these birds duck down their heads, and make off into the undergrowth very much after the fashion of the guinea fowl. Their plumage is very hair-like, and especially adapted for throwing off the moisture which the vegetation is usually laden with, as the Kiwi is a nocturnal bird, that is, it sleeps during the daytime and becomes active at night.

It is rather an interesting fact that all the flightless birds use their feet as weapons of defence or offence. The Kiwi delivers blows in exactly the same way as does the ostrich, raising its leg high up into the air, and striking with a swift downward movement. However, seeing that the Ostriches, Cassowaries, Emeus, Rheas, and Kiwis are all relations, it is but natural they should have the same habits more or less.

Extinct Species.

In New Zealand, until the advent of Colonists about four hundred years ago, there existed a gigantic ostrich-like bird called a Moa, which is now quite extinct. There were about twenty species, the largest being about twelve feet in height, and the tibia bones measuring over three feet in length.

In Madagascar, from time to time, enormous egg shells have been excavated from the marshes, which measured thirty-six inches in circumference. Naturally, it was assumed that a giant-like bird must have laid these eggs, and assiduous search was made, which resulted in the discovery of the bones of what must have been a bird of colossal proportions far exceeding the Moa in size and build.

POULTRY FOR PROFIT.

THE VIRTUES OF THE WYANDOTTE.

By Norman A. Axe, of Kimberley.

The following paper was read by Mr. Norman A. Axe at a recent meeting of the Griqualand West Poultry, Pigeon and Cage Bird Club:

In writing this the first of a series of papers to be read before and discussed by fanciers connected with the Griqualand West Society I have endeavoured to make it interesting and instructive both from a fancy and utility point of view.

The Wyandotte is one of the best known and popular breeds, and one that by its all-round usefulness, beauty and merit has won its way to the very forefront of our present-day breeds of poultry. Although there are eleven different varieties or colours, it is my intention to only deal with those that are known or bred in South Africa, viz., the Silvers, Golds, Whites, Partridges, Silver Pencilled and Columbians.

It was about 1884 when first the Silvers were introduced into England, and with its beautiful, attractive plumage combined with all other good qualities necessary in an all-round fowl, it has steadily gone ahead and been bred to such a high standard of excellence till to-day it stands out a world-wide favourite amongst fancy and utility poultry keepers alike, equalled by few and excelled by none. I admit there are other breeds, such as Game and Dorkings, that are better as table birds, and others, again, such as the White Leghorns, that have as strong a claim as layers, yet as a combination of the two there is no other breed that can equal it.

It is not my intention to make comparisons that are odious to those who keep other breeds, but I think I may safely claim without fear of contradiction that there is no other breed that is bred more uniformly to the standard laid down than is the Wyandotte. Although colour and markings have the chief consideration from breeders, yet these are not cultivated to the detriment of all other points, as is the case with some Mediterranean breeds, where most other points are sacrificed for excessive combs and lobes.

In style and shape the Wyandotte somewhat resembles the Brahma, although it is distinctly smarter in appearance and has nothing of this breed's awkwardness about it. Its compact and cobby body, graceful arched neck, bold breast, short back and neat tail, give it a natural, proud carriage, and stamp it as the embodiment of vitality and vigour. From a fancy point of view the Wyandotte is all that a breeder could wish for. The number of its supporters is tremendous, and although prices have reached up to £165, £100, and £75 for a single bird of this breed, I have no hesitation in saying that it has by no means reached the limit of its popularity, and a few years will see it far in advance of its present-day rivals. From a utility fancier's point of view I think the following facts and figures are sufficient to convince anyone of its excellence and of its usefulness either to the farmer who has a wide range, or to the cottager who has only a back yard. The records of the various competitions organized and conducted by the English Utility Poultry Club form very interesting reading. I think the first competition was held in 1898, although of this and the one held in 1901 I regret I am unable to find records, but in the one held in 1899 we find Golds occupying third position, with a total of 133 eggs; in 1900, Silvers are first, with 223 eggs; in 1902 Golds are first, with 200 eggs; and Silvers sixth; in 1903 Whites are first with 276 eggs, which number constitutes a record, neither excelled nor equalled by any other breed in any competition of 16 weeks' duration ever held. In 1904, Whites again occupy first and second positions with 243 and 218 eggs respectively; in 1905 Whites occupy the third, fifth and sixth positions, with 226, 187 and 180 eggs. In the present competition now being held at Home the results of the first four weeks are just to hand, and we find that in Section A, White Wyandottes occupy second and third positions, and in Section B, Partridges are first, with Whites third. Considering that these competitions are held in the most severe winter months at Home, and are open to any breed, the positions held and records established are very gratifying to those of us who are supporters and breeders of the Wyandotte. In a competition held in the sister Colony of New Zealand, and which concluded on December 31st, I notice that Silvers proved their superiority over all other breeds by occupying first, second and third positions. Although the climate and conditions are different in South Africa to those prevailing at Home, the change in climate has no deterrent effect on the prolific egg production of the breed, and in the competition now being held at Rosebank, White Wyandottes occupy second position, and have laid well and consistently all through. I have also a few records, kept and supplied me by Mr. Batten, of McFarlane's farm, who describes the Wyandottes as in his opinion the ideal farmer's fowl, and admirably adapted to the requirements of poultry keepers in the Kimberley district. The two pens kept were Silver Wyandottes, each composed of five hens and cock of no specially selected strain, kept under natural conditions, and given no forcing foods whatever, and in the five months from June to October inclusive, when eggs are dearest in Kimberley, their output was as follows: Total eggs, 891; average per month, 179; average per hen per month, 18. When it is taken into consideration that 9d., or the price of three eggs, will feed each hen for the month, it will readily be seen that there is a very good margin towards rent and trouble to be placed to profit account.

Mr. Dott, of Dronfield, who goes in for Silvers extensively, describes them as prolific layers, excellent table birds, hardy and healthy, and well adapted to the conditions of poultry-keeping in this district.

Mr. Hobbs, of Kenilworth, whose thoroughness and practical management of his poultry is well known, has kindly supplied me with a few interesting figures relating to his Silver Wyandottes. He finds the local cost of keep of adult fowls works out about 9d. each per month; weight of Silver Wyandotte cockerel at 10½ weeks, 4 lbs. 2 ozs.; this was not fattened, but just picked up from the run. Laying qualities: Five hens hatched, October and November, 1905, one bought at show, June 30th, 1906. These have laid up to December 31st, 1906, 684 eggs. Of the above six hens one was setting seven weeks, one four weeks, and two were setting and with chicks seven weeks each. Also one hen has never been broody, and one only once, and that in December. The results give an average of 114 eggs per month for the six hens, or 19 eggs per hen per month, and compared with the laying competition now being held in Cape Town, these birds, up to December 31st, equalled third position, despite the fact that four of them were set and hatched chickens. Mr. Hobbs further says: "*Re* health, I have only lost one adult in 18 months, and that was a cock, and from appearances it seemed to have injured itself internally; no apparent disease. The chicks are very hardy, and rapid growers, if fed and looked after properly." I trust the foregoing figures have not proved altogether uninteresting, as I have given them to shew that the Wyandotte has not gained its great reputation merely from a fancy point of view, and to prove that it is a breed the extensive cultivation of which in South Africa would go far towards preventing the tremendous amount of money leaving this country every year for eggs and frozen table birds; the amounts of which for nine months in 1905 were: 17,341,799 eggs, to the value of £67,264; dead poultry and game, 57,643, to the value of £10,230. I obtained these figures when down in Cape Town recently, and was astonished at the tremendous amount of money sent away, and which might easily be kept in the country by local industry.

MATING AND BREEDING

It would occupy too much of your time to go as thoroughly into the mating, etc., of the different colours as I would like, but will deal as briefly as possible with each one, noting the chief points and defects of the colours that are bred and exhibited in South Africa. The one great problem that troubles beginners in this country is where to get reliable material to form their strain, and it is to be regretted that so many of the breeders at Home (although this does not apply in every case) are so unscrupulous in the value and quality of birds they send out to this country. In many instances the pens sent are good enough in quality, and, if only like would in every instance produce like, there would be no cause for complaint; but realizing that if good birds are bred here there would be no necessity to send Home for stock, many breeders with their knowledge of pedigrees, etc., so mate the birds that 15 out of every 20 of their progeny are wasters, and the other five only moderate. I am hoping that the near future will see strains established here equal to the ones at Home, and from which we may be able to procure reliable stock, instead of having to send Home whenever a change of blood is required.

GENERAL CHARACTERISTICS.

As the general characteristics of all varieties are the same, I will give them here, the only difference being colour, which I will give separately. The male: Head short and broad; face, wattles and ear lobes bright red; neck, medium length, well arched and with abundant hackle; back, broad and flat; saddle, broad, and rising gracefully to the tail; body, short, broad, deep and nicely rounded; breast, full and round; wings neatly folded and of medium size; tail full, neat and nicely rounded; shanks, bright yellow, perfectly free from feathers, medium length and stout. The female: Exactly similar in above points, allowing for difference in sex. It is good to have an ideal, but in striving to obtain this I would like to impress upon breeders the necessity of paying attention to the utility point, and endeavour by judicious selection to produce a harmonious combination of beauty and utility. The useful qualities of the Wyandotte must be maintained. It is the corner stone of their reputation amongst those who judge it from a utilitarian standpoint, so that in aiming at beauty of plumage we should by no means lose sight of the other part of the question.

I will now give a brief description of the different colours, and try to give a few hints on the mating and breeding.

THE SILVER WYANDOTTE.

It was in 1884 that the first Silvers were sent over from America to England, and if testimony were needed that breed has proved itself to possess all the good qualities claimed for it by its originators.

It is worthy of note that the pioneers of its introduction into England are to-day a quarter of a century after amongst its most successful breeders and staunchest supporters. In 1891 my parents purchased for me a pen of this colour, and, although rather young at the time, I can look back on a few years' experience and interest in the breed, and have noted the steady rise and difference in quality, particularly from the pen I first had and the stamp of bird I try to obtain now. In 1895 a pen of Golds was added, and these, coupled with the more recently introduced Partridges, are my favourites. The jet black lacing on a pure white ground of the Silvers forms a striking colour, and breeders should note particularly in the stock birds that the lacing is as dense as possible, and not brown; that it extends right round the feather, and that the white ground colour is as pure as possible, and free from ticking or mossiness.

In mating, it is better to mate up two separate pens for pullet and cockerel breeding, taking for the pullet breeding pens hens as near perfection as obtainable, mated with a cock of pullet breeding strain, inclined to be laced rather than striped on top, and possessing a soundly laced breast. He should also have perfect wing bar, and be laced on the edge of every flight feather.

For the cockerel breeding pen, procure a cockerel as near the ideal as possible, and mate with big good-shaped hens, good in head points, big and shapely, soundly laced on breast, with well striked hackle and black tail. A little mossiness in cushion is no detriment.

We have not as yet had the perfect bird (although some of the best at Home come very near it), so I will point out what I consider the most serious and prevalent faults, and those to be guarded against by breeders. In the male, one of the chief failures is bad top colour and sootiness in saddle and hackle. This is one of the most difficult points to breed out, and fanciers should pay more attention to this, as nine out of every ten Silver cocks I have seen in Cape Colony failed more or less in this respect. The back should be pure silver, and the hackle and sickles silvery white, with a black stripe down centre. A bird with black tipped or spangled hackle is to be avoided. Many cocks fail in breast, and a bird with a breast full of sound lacing from throat down to thighs and hocks is difficult to get. Many that are sound up into throat run out at bottom of breast, and others, again, sound at bottom of breast, and well laced on to thighs and hocks, are black in throat. Most of these defects apply equally in the female, but the worst fault, and one that is very prevalent, is mossiness on cushion. Here, again, breeders will find a difficulty in producing birds entirely free from this.

THE GOLDEN WYANDOTTE.

The origin of the Golden Wyandotte is somewhat uncertain, and as it was some five years after the Silver that it was brought out, some say that it was produced by crossing Silvers with a breed known in America as Winnebagoes. Whatever their origin, there is no doubt that they are one of the most useful and popular varieties, and a more useful all-round fowl no fancier need wish for. In the Home country there is always a ready market for good birds of this colour, and as the South African poultry industry advances, and as the advantages to be derived from breeding pure bred stock are more generally recognised, I think Golds will take one of the leading places, as the hot sun has not such a damaging effect on the plumage of the exhibition birds as on that of some other colours. The hens are first class, all the year round layers, and good sitters and mothers. The chicks are hardy and grow quickly, and the cockerels when fat are excellent table birds. The pullets mature quickly, and commence laying at from five to six months old. The eggs are a nice shade of brown, and although some people complain that they are none too big, what is lacking in size is made up in quantity. It is not necessary to go over the ground again in all details, as if a rich golden bay ground colour is substituted for the white ground colour in the Silver, the general characteristics are the same. The cock should have rich golden bay neck hackle, with distinct black stripe, as in the Silver, and saddle hackle should correspond in shade. The wing bow and shoulder colour should be a rich golden bay, bars and flights same colour as breast, with lustrous black lacing; tail black; breast bright rich bay, with lacing as in Silvers; shanks bright yellow, free from dark shade or spots. The same description applies to female, with allowance for difference in sex, with back and cushion laced same as breast, and centres of feathers free from mossiness. A little latitude as to depth of colour is allowed, providing it is the same shade all through, and the lacing clear and well defined. A great defect that appears in many of the strains of Golds is a comb deficient in spike or pea comb, which I think was introduced by the breed being crossed with Indian Game to obtain depth of colour. In selecting birds for the breeding pens, the same remarks apply as in Silvers as regards lacing, but in Golds care should be taken that the ground colour is rich, bright and even all through, and hens for cockerel breeding should be good in hackles, lacing on cushion heavy, giving rather a dark appearance and a little mossiness in feathers is no detriment.

THE WHITE WYANDOTTE.

The next on the list is the Whites, and had Mr. Williams not been away, it was my intention to ask him for the loan of a pair of his typical birds for exhibition here to-night, which I feel sure would have been readily granted. There is nothing mysterious about the origin of this variety, as they are purely a sport from the Silver. Many fanciers for a time spoke disparagingly of them, through this, but far from being to their disadvantage, it is in my opinion the opposite. They are tamer Wyandottes than some of the varieties. The White has made a great name in the utility world, and from the high positions they have occupied in the laying competitions held during the last few years, if there were such a title as champion layer I think it might aptly be bestowed on the White Wyandotte.

In all points, except colour, the White is the same as the other varieties. The most difficult point in breeding is to obtain purity of colour; not only should the surface be pure white, but also the under-colour, right to the skin. It is difficult to get the cockerels entirely free from a yellow tinge, especially on hackle and saddle, and very often pullets that look to be pure in pen will, if examined, be found to have a shade of yellow in under-colour. As in other white breeds that are intended for exhibition, these should be kept well shaded from the sun. If exposed, the top colour will soon shew signs of it by turning yellow. It is very easy to tell whether the straw colour is the result of exposure. If so, on turning up the feathers the under-colour will be found to be pure white, and if not, the straw colour will extend right to the skin. It is difficult to tell what the chicks will turn out until they have got their full feathers, and they are dried out, the sap in the feathers giving them a yellow appearance. In many instances, birds in their second feather are much purer in colour than they were during their first feather.

I can remember some beautiful hens of this colour, notably Morton's Princess and Anthony's Blossom, who won a great number of prizes in their respective seasons. A great point in favour of Whites is that they improve with age as exhibition birds, for the first two or three seasons, and being more developed can generally beat the young birds. They are good setters, gentle mothers, easy to break of broodiness, and are not long before they are laying again.

They do well in confinement, but are difficult to keep clean when penned up; but where they have an unlimited run nothing looks prettier than a flock of Whites. Very little need be said as regards mating and breeding. The main points to aim for are purity of colour, as large and good shape as possible, neat head points, pure coloured beaks, and rich legs.

THE PARTRIDGE WYANDOTTE.

It was as recently as 1896 that this variety made its appearance, and judging by the amount of popularity they enjoy at the present time, they have come to the front quicker than any other breed, and both at Home and out in the Colonies are looked upon as the most popular fowl of the present day. The last two seasons at Home have certainly been sensational ones for the Partridge Wyandotte breeders, the demand being enormous, and prices for good birds ruling high. The International Club Show winner of 1905 changed hands three times, first for £50, then for £80, and the last time for £165. Again, this year's Palace winner changed ownership a month ago for £100. In addition to these, other birds made from £65 downwards; last year's Dairy winning pullet made £75, and £50 being offered and refused for another one.

They are very handsome in appearance, being in colour exactly the same as the Partridge Cochin, and, taken up either for exhibition or utility purposes or for a combination of the two, they will be found to fill the bill in every respect. The Americans cannot claim sole credit for the production of this variety, as several English fanciers manufactured a strain of their own, and at the present time there is a wide difference between the English and American standards, the English standards requiring the male birds to be bright in top colour, whilst the Americans require a dark top; also in the hens, that of the Americans requires a dark or foxy ground colour, and that of the English specifies a light brown colour, free from red or yellow tinge.

In my opinion, the English standard is the better of the two, as the rich, bright top colour of the cocks, although perhaps more difficult to obtain, forms a greater contrast with the jet black breast, and gives the bird a far more handsome appearance than that of the American cocks, while in hens the pencilling on a light brown ground colour is far more effective than that on a dark or red ground colour.

The type of Partridges should be exactly the same as that of the other breeds of Wyandottes, and the colour as follows:—The male: Neck hackle rich orange or golden red, with paler shade at bottom, and each feather being striped down centre; breast jet black, and perfectly free from markings; back and shoulder rich red, solid black wing bar, and rich bay flights; fluff and tail, sound black. Hen: Neck hackle golden yellow, with black stripe; breast, light ground colour of even shade, and distinctly pencilled, with a darker shade, uniform throughout; back, same as breast, the pencilling to extend well to tail; wing, same colour as back.

As in other marked varieties, it is necessary to have two strains for breeding, one for cockerels and the other for pullets. For the pullet breeding pen, select hens as near as possible to perfection, and mate with a cockerel of a pullet breeding strain, with rich, bright, even top colour, and pencilled on breast and fluff. For cockerel breeding, select a male bird as near standard as possible, and mate him with big, shapely pullets, good in hackle, head and legs. It does not matter if hens fail in pencilling, but it is important that they are of a cockerel breeding strain.

THE SILVER PENCILLED AND COLUMBIAN

are colours that appear to be making headway at Home, but as they are little known yet out here, my remarks will be brief.

The only fanciers who have imported Silver Pencils to South Africa are Mr. Smith, of Wynberg (who speaks very highly of their good qualities), Mr. Pearson, of Stellenbosch, and Mr. Woodburne. When they become better known and exhibited at our South African shows, they will not be long before they have more admirers and supporters, and to the fancier or breeder who wishes to take up a breed that promises to become one of the most popular, I would recommend the Silver Pencilled Wyandotte. The colour and markings are the same as those of the Dark Brahma, and the general characteristics as in other colours.

The Columbian is one of the latest introductions, and in some quarters a great future is predicted for it.

The only pen I know in Cape Colony is in the possesion of Mr. H. D. Pitts, of Rondebosch, and is in colour and marking exactly like the Light Brahma, and in shape, head and legs as the other varieties of Wyandottes.

In dealing with a breed that possesses such a large family as the Wyandotte, it has of necessity made my paper rather a lengthy one, but I trust it has not proved wearisome. If there is any fancier here who is desirous of taking up a new breed, I can confidently recommend the Wyandotte, or if there is anyone prepared to take up poultry keeping on the scale of Mr. Archibald, of Kenilworth, to stock the outlying districts with a really useful breed of fowl, to stem the tide of the millions of eggs that are being imported to this country, and obtain some of the £67,264 that is being sent away every year, I would propose a Wyandotte farm, resting assured that if the right strains were obtained, and sound, common-sense management used, it would prove an immense success.

In conclusion, I would like to thank you, Mr. Chairman, and gentlemen, for your attendance, and Mr. Woodburne for the loan of the pullet breeding Partridge cockerel, which I consider a most typical Wyandotte, and also the Silver pullet, which gives us a very good idea of the distinctness of black and white required, although she is not big and open enough in lacing.

THE QUALITY OF MILK.

An Investigation into the Quality of Milk produced by Different Breeds of Cows at Elsenburg Agricultural College.

By G. N. Blackshaw, B Sc.

Object.

This investigation has extended over the period October, 1906, to February, 1907, with the object of ascertaining the quality of milk produced by the following breeds: Friesland, Jersey, Shorthorn, Ayrshire, and also Cape.*

Time of Milking.

The cows were milked twice daily—6.30 a.m. and 4.30 p.m.—the intervals between the milkings being fourteen hours and ten hours respectively. It can be said at the outset that unequal intervals of milking undoubtedly contribute largely to the variations in the quality of morning's and evening's milk.

Conditions Affecting Quality of Milk.

The chief conditions which influence the *quality* of milk besides "unequal intervals of milking" are breed, age, length of time since last calving (period of lactation), feeding, thoroughness of milking; true, there are other conditions, too, but those mentioned are the more important and are points which must be taken into consideration.

As regards the effect of food on the *quality* of milk, great difference of opinion exists; many maintain that you can improve the quality of milk by the judicious use of concentrated foods; others hold that change of food only effects a temporary change in the quality of milk produced, and that the quality returns to the "normal" as soon as the cow has become accustomed to the new diet; much evidence exists in support of the latter view; still, there are many who favour the former, consequently the question still remains debatable.

Collection of Samples.

Throughout the investigation the morning's and evening's milks were tested separately.

In the case of the "Breed tests," the milk was well stirred, and the sample obtained by introducing a glass tube open at both ends into the milk contained in a vessel with perpendicular sides; the tube was lowered to the bottom of the vessel, by closing the top of the tube with the finger a column of milk was then withdrawn and run into a glass-stoppered bottle To each breed were assigned two bottles, the one for morning, the other for evening samples. The composite samples so obtained were kept sweet by means of a little potassium bi-chromate, and tested weekly. This method was adopted for the Breed tests in order to ensure that the amount of sample taken was proportioned to the amount of milk produced at each milking

---

* Bred out of ordinary Cape cows and by a Friesland bull.

In the case of "individual cow" tests the milk was well stirred, samples taken in the ordinary way, and tested daily.

BREED TESTS.

Breed	Number of Cows used for test	Ages of Cows	Period of lactation (length of time since last calving) of cows in test	Percentage amount of Fat Average of five weeks		Average difference in the percentage amount of Fat, Morning and Evening
		Years	Months	Morning's Milk	Evening's Milk.	
Friesland	4	9, 3, 3, 7	11, 1, 5, 7	2·5	3·5	1·00
Jersey ..	5	3, 3, 4, 6, 6	1, 6, 8, 3, 6	3·7	6·05	2·35
Shorthorn.	2	3, 12	1, 2	2·47	3·79	1·32
Ayrshire .	2	4, 4	5, 5	3·19	4·82	1·63
Cape .	2	4, 4	4, 2	2·88	3·77	0·89

Points to be noted:—

(1) The great difference in the fat content of morning's and evening's milk, especially so in the case of Jerseys; from similar work carried out in Great Britain, this is attributable chiefly to the fact that the intervals between the milkings are unequal. Where the milkings are carried out at regular intervals of twelve hours, little difference has been found in the fat-content of morning's and evening's milk

(2) Friesland, Shorthorn and Cape produced milk averaging less than 3 per cent. fat in the morning.

It is somewhat unexpected to find Shorthorns giving morning's milk containing so low an average as 2.47 per cent. fat; allowance must, however, be made for the age of one of the cows and for the short time each had been in milk.

(3) The richness of the Jersey milk; this point is further borne out in the "individual cow" tests.

"Individual Cow" Tests.

Breed.	Name of Cow.	Age.	Period of lactation (length of time since last calving) at which tests were made.	Number of Tests made		Average percentage amount of Fat.		Lowest percentage amount of Fat recorded		Highest percentage amount of Fat recorded.		Number of times milk contained below 3% Fat.	
		Years	Months	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
Friesland	Cleopatra	7	1	15	14	2·42	3·22	1·55	2·6	3·35	4·0	12	4
	Rose ..	3	2	20	19	2·53	3·56	1·8	2·7	3·5	4·4	18	3
	Violet ..	3	6	20	20	2·77	3·71	2·05	2·95	3·25	4·65	14	1
	Bakker..	7	8	13	14	2·90	4·15	2·2	3·15	3·75	4·95	7	0
Jersey ..	Gladys ..	6	5	21	20	4·16	5·78	1·5	4·2	6·25	7·8	2	0
	Gertie	4	10	20	17	3·54	6·01	2·25	3·0	5·9	8·1	7	0
	Hilda .	6	8	21	20	3·92	5·76	2·35	4·3	5·2	7·0	2	0
	Rosa ..	3	3	20	20	3·30	6·06	1·9	3·55	5·45	7·8	9	0
Shorthorn	Maggie..	3	1	28	25	2·50	4·13	1·6	2·8	4·4	7·1	23	1
	Handsome	12	2	28	25	2·53	3·43	1·25	1·5	4·5	5·4	22	8
Cape ..	Bessie ..	4	2	20	18	2·79	3·77	1·35	2·15	4·5	5·05	12	1
	Disa ..	4	6	20	18	3·74	4·69	2·85	3·75	4·4	6·85	3	0
	Jean ..	4	4	19	17	3·28	3·68	2·35	3·15	3·85	4·8	4	0
	Jessie ..	4	1	19	17	2·99	3·78	1·95	3·0	3·95	5·1	9	0

Points to be noted:—

(1) Here again we note the great difference which exists in the fat-content of morning's and evening's milk.

(2) The great variation that prevails in the fat-content from day to day; for instance, Violet gave milk registering as low as 2.05 per cent. fat on the morning of November 14th, and as high as 3.25 per cent. on the morning of November 29th.

(3) The number of times the cows produced milk containing less than 3 per cent. fat.

Breed	Number of Tests made.		Number of times Milk below 3 °/₀ Fat.	
	Morning.	Evening.	Morning	Evening.
Friesland ..	68	67	51	8
Jersey ..	82	77	20	0
Shorthorn ..	56	50	45	9
Cape ..	78	70	28	1

"TOTAL SOLIDS" IN MILK.

Two cows of each of the following breeds—Friesland, Jersey, Shorthorn and Cape—were selected, and four direct determinations of the Total Solids made (two from samples of morning's milk and two from samples of evening's milk).

M—Morning's milk. E—Evening's milk.

Breed.	Name of Cow.		Date of Test. 1907.		Percentage amount of Fat.	Percentage amount of "Solids not fat."	Percentage amount of Total Solids.
Friesland ..	Cleopatra ..	M	Jan.	26	2·6	7·61	10·21
		M	,,	28	2·55	7 46	10·01
		E	,,	24	2·8	7·16	9·96
		E	,,	25	2·6	7 23	9·83
	Violet	M	Jan.	26	2 85	8·01	10·86
		M	,,	28	2·8	8·37	11·17
		E	,,	24	3·25	8·09	11·34
		E	,,	25	3·25	7 99	11·24
Shorthorn ..	Maggie ..	M	Jan.	26	2·65	8·75	11·40
		M	,,	27	3·1	8·89	11·99
		E	,,	24	3·95	8·74	12·69
		E	,,	25	3·8	8·74	12·54
	Handsome ..	M	Jan.	26	2·8	7·72	10·52
		M	,,	27	2·6	8 11	10·71
		E	,,	24	3 05	8·09	11·14
		E	,,	25	2·95	7·93	10·88
Jersey ..	Gertie	M	Feb.	13	7.0	9 59	16·59
		M	,,	14	6·0	9·38	15 38
		E	,,	12	7·7	9·68	17·38
		E	,,	13	7·15	9·54	16 69
	Rosa	M	Feb.	13	4·25	8·96	13·21
		M	,,	14	3·75	9·01	12·76
		E	,,	12	5·8	8·99	14·79
		E	,,	13	5·55	8·94	14·49
Cape ..	Bessie	M	Feb.	23	3·3	8·06	11·36
		M	,,	24	3·45	8·00	11·45
		E	,,	22	4·0	8·12	12·12
		E	,,	23	3·8	7·63	11·43
	Jessie	M	Feb.	23	3·0	8·20	11·20
		M	,,	25	3·35	8·06	11·41
		E	,,	22	3·7	8·31	12·01
		E	,,	23	3·85	8·22	12·07

It will be noticed that only the Jersey cows and one Shorthorn cow gave milk containing "solids not fat" higher than 8.5 per cent.

In Great Britain the standard for milk is 3 per cent. fat and 8.5 per cent. "solids not fat"; milk falling short of this standard is deemed to be deficient, and the vendor of such is liable to prosecution under the Food Adulteration Act. From the above results one is forced to the conclusion that a good deal of evidence must be forthcoming before such a standard can be accepted in the Cape Colony.

CATERPILLARS DESTROYING TREES.

(*Antheraca tyrrhea.*)

Mr. A. G. Erlank, writing from New Bethesda, on February 15th, says:—

The following I trust might be of interest to your readers, and at the same time be the means of obtaining from those who have successfully combated the pest, an easier and more effective way of making an end to the large black and white caterpillars—the larvæ of a big brown moth—that are at present destroying trees and other vegetation in our villages and surrounding farms. They seem to have a peculiar predilection for willow and poplar trees, but pepper trees, quince hedges, and "Blaauwbosch" are also attacked, and on pumpkins and lucerne were they found to feed. They strip the trees completely of their leaves.

The moths leave the pupal stage in about the month of October, and in a few days' time, begin to deposit their eggs, which in some cases number up to 200 or 300 for one moth. These eggs look like homeopathic pills on the leaves of the trees, and after a few weeks they begin to hatch out, when the trees will be found to be swarming with caterpillars of all sizes, from an eighth of an inch to four inches long, and doing their destructive work. When full grown, which happens in about three weeks' time, they drop off the trees, seek a soft spot in the ground, creep in, and in less than two days take on the pupal or chrysalis stage, where they then appear to lie dormant until the following October.

Our Municipality decided to buy up the caterpillars, with the following result for one month: 297 5-gallon parafine tins full, at 9d. each, holding between 3,000 and 4,000 caterpillars; 1,330 pupæ at 3d. per dozen; 7,600 at 1d. per dozen; and 16,700 at 3d. per 100; also 330 bunches of eggs at ½d. each; total £18 10s., including 11s. 9d. for caustic soda sprinkled over the mass. Over 100 children, both white and black, boys and girls, took part in collecting, some earning as much as 10s. a week.

I have no doubt that the Municipality will see a good return for the money expended, for taking the increase of the number destroyed at the lowest possible estimate, it means that we shall have the prodigious number of forty-five millions less caterpillars next year.

Any information or advice you could offer on the subject would, I assure you, be very much appreciated by agriculturists.

On this, Mr. C. P. Lounsbury, Government Entomologist, writes:—The subject of the above very interesting communication is assumed to be *Antheraea tyrrhea*, a native insect which occurs both east and west in the Colony. Ordinarily at least it is not a pest of consequence in any one locality for more than a few successive seasons. Sometimes it practically disappears after one season of great abundance, but at other times it remains troublesome for three or four years. Almost every season since I came to the Colony in 1895, I have had complaints regarding it from one or more districts From 1896 to 1899 I remember it to have been extremely common around Wellington. In 1898 I noticed it in abundance around Grahamstown. About 1900 it became very troublesome in wattle plantations on the frontier, and then for several years complaints of it from the country between Queenstown and Kei Road were common. Then it began to come into prominence in parts of the Transkei, from which it is now, I believe, again disappearing. In 1903 a grove of poplars at the Elsenburg Agricultural College was stripped clean of foliage by it, and some damage done to oaks and a few fruit trees; even vines and vegetable plants suffered some harm. Last year it was reported to be abundant near Darlington in the Midlands, the thorn trees over a considerable area being defoliated. Willow, poplar and acacias, both native and introduced, are preferred food plants, but a number of veld shrubs are as attractive to it as anything.

Hand collection of the eggs and caterpillars are the remedial measures generally used when anything at all is done, and both the egg clusters and the caterpillars are such conspicuous objects that the preservation of limited numbers of fruit and ornamental trees is not difficult of accomplishment. It seems necessary for the caterpillars to find a soft spot at which to enter the ground for pupation, and frequently they crawl hundreds of feet searching for a suitable place. This fact has led me to suggest to a number of farmers that they plough a furrow here and there in their wattle plantations in order to provide loose soil for the caterpillars that can be raked over for pupæ, or perhaps be rooted over by hogs or scratched over by fowls or other birds; but I do not know that anyone has tried the value of the suggestion.

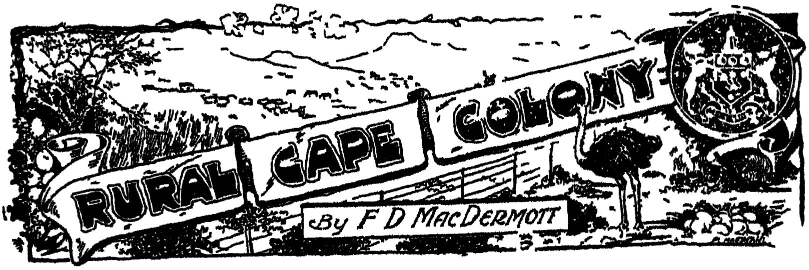
Between its intervals of abundance the insect is doubtless either held in close check by its parasitic enemies or else is actually exterminated over areas of many square miles in extent. A Tachinid fly, about the size of the common fly which blows meat, lays its eggs on the caterpillars, and it follows that many pupæ instead of yielding moths yield parasitic flies; ten or a dozen may emerge from a single pupa Another common parasite is a Microgaster ichneumon. The larvæ of this tiny wasp, after having become full fed within the caterpillar, emerge through the skin of the back and spin their erect, cream-coloured cocoons on the surface. These are about a fifth of an inch in height, and not uncommonly a dozen to twenty-five are found protruding from a single unfortunate caterpillar The infested caterpillar grows slowly compared with his healthy brethren, and eventually succumbs after, perhaps, having roamed about for several days with cocoons on his back. The wasps escape from their cocoons through a circular hole which they cut in the apex. The caterpillar eggs, too, are subject to parisitism, and probably as much towards suppressing an outbreak of the pest is accomplished by the tiny egg parasites as by the larger enemies.

One may ask how it happens that the parasites do not always keep the pest in subjection. I cannot give a wholly satisfactory answer But nearly all insects have waves of abundance due, apparently, in large part to fluctuations in the numbers of parasitic enemies, and it appears to me that the conditions in this Colony are specially favourable to extreme ups and downs for this particular caterpillar. In most parts wide stretches of veld bearing few or none of its food plants separate localities where it finds an abundance of food. Therefore, the spread of its enemies from parts where it has been suppressed to parts where it is rapidly increasing must be severely limited, and an outbreak in an isolated valley like New Bethesda consequently remains to be dealt with by the descendants of comparatively few individuals. One can imagine that the suppression in a small area may in time be complete, and the part, therefore, remain free of the insect until a chance introduction takes place from which, with little interruption from parasites, immense numbers are again bred; meanwhile that chance introductions of the parasites also take place, and that gradually the pest is again overwhelmed. Were the food areas continuous over a great extent of country, I think the ups and downs of the insect would be much less marked.

The New Bethesda authorities do not appear to have taken parasites into consideration in their dealings with the past. It is possible that they might have done so with considerable advantage, although at the expense of much additional trouble. The eggs collected could have been placed in a box stood over water so as to have allowed winged parasites to escape, but not the newly hatched caterpillars; and any unhealthy-looking caterpillars and all the pupæ could have been caged within wire netting of a mesh sufficient to keep in caterpillars and moths, but not the parasites which might come from the caterpillars and pupæ. By taking such steps the ultimate subjection of the pest by its enemies, which is certain to happen, might have been materially hastened. In the calculation of the number of caterpillars for the next season prevented by the work, the parasitism factors were also neglected. It is possible that the estimate of forty-five millions is a low one, but on the other hand, if parasites are now on the rapid increase, the progeny prevented may be less than the number of the insects killed. Probably the direct results amply compensated for the money expended, however, without any reference to the coming season. I think the best outlay was the purchase of the eggs, and the poorest that of the pupæ, even at 3d. a hundred.

CHAS P. LOUNSBURY,

Entomologist.

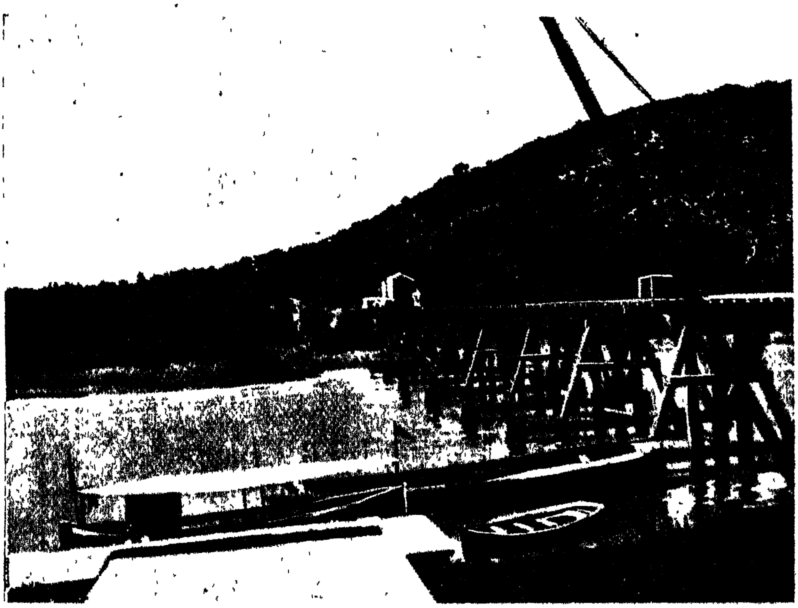


No XXIV

IN THE DISTRICT OF HUMANSDORP.

IRRIGATION FARMING ON THE GAMTOOS RIVER VALLEY.

The South-Eastern coastal belt of this Colony contains many attractive corners which, in a quiet way, are working wonders for the farmers and producers who have settled there Among these not the least important is the Gamtoos River Valley, which has, comparatively speaking, quite recently been brought within the range of practicable markets by means of the light railway constructed from Port Elizabeth to Avontuur This railway is only two feet wide, yet it serves the purpose better than a more expensive line in fact, it is doubtful if the standard gauge could be worked so economically in such a rough country, and as a result the people of the districts served are reaping the benefits of cheaper transport than they could otherwise enjoy. The line crosses the Gamtoos River a few miles above its mouth, which for some distance above the bridge is subject to tidal influences, yet, strange to say, there is no complaint of salt, and these waters are freely used for irrigation purposes on both banks In point of fact, it has been seriously suggested to lay out for irrigation a large extent of flat on the eastern bank of the river much lower down than the bridge, as it is maintained that all this could be brought under the river waters without the least fear of "brak." But, generally speaking, the bulk of the valley right up to Hankey, and some distance beyond, is rather narrow, and this seems to have militated against any large general scheme on the lower reaches at least. At the Gamtoos Bridge itself the river runs between high, steep banks, which take the form of red sandstone cliffs a little higher up, and form a most picturesque background. The journey up the river in the motor launches provided in connection with the railway service is most enjoyable, the scenery being very pretty, and the novelty of so pleasurable a method of travelling being a most enjoyable break to the monotony of cart and train which prevails everywhere else in this Colony. There are very few places in South Africa where one can start out in a comfortable launch, and after gliding gently over the placid waters of a stream as broad and impressive as the Gamtoos, make calls upon friendly farmers, and while picking up information of value and adding to one's knowledge, at the same time thoroughly enjoy a really pleasurable outing. There is usually an element of excitement of one kind or another in travelling off the beaten paths in this country, but here on the Gamtoos, all seems peace and prosperity. Very shortly after leaving the neighbourhood of the bridge, a favourite spot for picnickers and holiday-makers from Port Elizabeth, one soon begins to see signs of the main industries of the valley. A few miles of the striking red sandstone cliffs, mentioned earlier, and then the valley opens out a little, and at the first sign of level ground approaching anywhere near the river the pumping engines begin to make their appearance. The engine houses look quaint little structures perched up against the banks with their long stretches of pipe running out



The Gamtoos River at the Railway Bridge.

into the stream, and puffs of smoke and steam rising from their funnels. Here, on the lower reaches, the irrigation nearly all consists of pumping by means of steam power. There seems to be an abundance of fuel and a twelve or fifteen-horse steamer connected to a centrifugal pump seems to lift sufficient water for a goodly stretch of properly levelled land. In one case I saw a twelve-horse engine with a six-inch pump easily supplying about a dozen morgen of land under crops of various kinds. So it will be seen that if it comes to a question of costs the probabilities are in favour of the steam lifting as against gravitation. It has always to be remembered that in a valley of this peculiar formation leading water by gravitation is almost impossible, so that the steam engine, or power pumps of some kind or another, are bound to be brought into use. Another fact which militates against the general adoption of gravitation on the lower reaches of the river, and on some of the higher reaches as well, is that the fall is so slight that the headworks would have to be carried back for many miles to secure sufficient flow of water for distributing purposes. There is only one possibility that seems at all feasible, and that would be the adoption of a huge scheme of gravitation which should not only supply those farmers who are now irrigating in the valley, but provide water for the broad flat which stretches away below the railway bridge, and seems to offer such tempting opportunities for irrigation on a large

The Hankey Irrigation Tunnel Showing Stream of Water.

scale. To undertake such a work, however, would call for more capital and co-operative effort than is ever likely to be available for a scheme of this description in South Africa. But it would bring enormous stretches of land under water which must perforce remain poor, dry pasture or bush without it. If the scheme were surveyed, the estimate of cost would probably frighten at least two generations, so there is not much to be gained by discussing it here, except in possible outline. To make it really workable, it would have to start at Hankey, where a tunnel is brought through the mountain. It would mean first considerably enlarging the tunnel, then keeping the supply much higher in the valley all the way along until it was ultimately delivered on Montplaats, the flats I mentioned previously as offering such attractions for a really big scheme.

It is not only in the Gamtoos Valley itself that irrigation farming is successfully carried on in this district, but all the tributaries of that river are brought under control to a more or less extent. After leaving the vicinity of the pump irrigators, which are mostly situated below Hankey, one gets into the region of the gravitation men. Of these by far the largest is the London Missionary Society, which has created Hankey as an irrigation settlement, and must have done very well for itself by its efforts. The corner in which the Hankey settlement is situated is formed by a huge bend in the river, where an extensive flat has been built up by ages of flooding and sedimentary deposit. To get the water on to the flat it was found necessary to cut a tunnel right through the sandstone mountain which here flanks the river for some miles. This work was taken in hand by the missionaries many years ago, and brought to a successful issue after many months of toil and dangerous labour. As will be seen from the illustrations herewith, no attempt has ever been made to give the work anything approaching a finished appearance. No masonry has been employed, the only work which has been done having been that of roughly piercing the mountain in the simplest possible manner. This tunnel is about two hundred yards long, and it delivers a stream of water about six feet wide by some two to three feet deep—according to the flow of the river. The whole of this work must call for further attention before very long, for the friable nature of the sandstone as it weathers on exposure must cause large slices to be detached to fall away down the mountain side, with the possibility of seriously damaging the furrows as they wind round the base of the hill. This water is led almost directly upon the lands which lie below the tunnel, and from there round by a place known as Miltown—where a mill is driven—on to the river again, and from thence to Hankey and the arable lands which lie below the village. All the works are of the most primitive nature, but effectively answer all practical purposes. Some day possibly the engineers will be called in to put things into shape and increase the natural facilities which the earlier pioneers were so keen to take full advantage of, and when that time comes this region will have to step out of its semi-obscurity into the broad light of day as one of the most fruitful sections of the Colony. I had not time to go higher up the river, where much that is interesting is being done in the shape of increasing production, all from the never-failing waters of the Gamtoos and its tributaries, but I took a short journey up the Klein River, which joins the Gamtoos at Hankey, and was pleasurably surprised at seeing what has been done in these highly productive valleys.

With such a soil—practically the wash from the Karoo, teeming with lime and organic matter—it is scarcely necessary to state that the difficulty was to find out what would not thrive here. Cereals of all descriptions are grown. Leguminous crops like lucerne also do remarkably well, while potatoes are almost always a prolific crop. The gardens at Hankey are now fairly well planted with fruit trees, and the varieties established seem to have succeeded very well indeed. It is undoubtedly a magnificent citrus country, and this is shewn by the success which has attended the orcharding of these fruits hereabouts. When Mr. Pickstone visited this valley some years ago—to be accurate, in 1892—he estimated that sufficient citrus fruits could be produced in this valley and its tributaries to supply the whole of South Africa, and leave some over for export. What was true then is just as true now, for the spread of irrigation must bring under cultivation enormous areas which will be even more suitable for citrus fruits than the valley soils now in use. The hill-side lands should do much better for this purpose when the water is carried up to those levels. The irrigable lands in and around the village of Hankey must cover well over a thousand morgen, and there are still large areas which could be made available. Of course, the future of a spot of this description is largely bound up with that of transport, for it would be of very little use producing bulk crops with no means of getting the stuff to market. This it is hoped will be remedied by the construction of a branch line of railway from Gamtoos Bridge along the east bank of the river right up to Hankey. When that line is completed, it will pass through one of the most picturesque strips in the whole country. Nothing can be more fascinating than the magnificent sunset effects on the red sandstone bluffs which border the river for at least five miles after leaving the bridge. And from there onwards the line will wind in and out among beetling cliffs of a most rugged description. Facing the line on the other bank are the farm lands of the irrigators, with their beautiful green stretches of lucerne and other crops, their fruit orchards, comfortable dwellings and farm buildings. For right here are some really energetic and progressive farmers who have settled several problems of production to their own satisfaction, and now seem to be on the high road to success. Among these I may mention Mr. Arthur Gordon, who has something like sixty morgen under irrigation from his pumps driven by steam and oil motors, including a very fine young orchard. A little higher up is Mr. Alfred P. Kleudgen, at Riverside, who has a very nice strip of good land laid down to lucerne, as well as other crops, and is preparing more to lay down to this valuable fodder. This is also all raised under lift irrigation, the motive power being steam. Higher up towards Hankey are the Plessis, who are also pump irrigators, and who are doing very well. In fact, altogether there are from thirty to forty fairly powerful pumping plants on the river within as many miles, and all are doing well. The gravitation irrigators do not shew any very great enterprise or originality in their methods. The loose stone dam, packed with a little bush, to act as a diverting weir or to raise the level of the stream sufficiently to keep a simply constructed intake supplied, satisfies the bulk of their ambitions. These, of course, melt away with every flood, but they are so easily repaired, or, if necessary, re-constructed, that they are not missed very much except just after the subsidence of the flood. In a stream so heavily charged with silt as the Gamtoos in flood time, it is doubtful whether any form of permanent weir would be so suitable to all the exigencies that arise.

The Hankey Tunnel from the front.

The lift irrigators also have very serious troubles in flood times. It is a very common thing for the silt of an ordinary flood to bury the foot valves of the suction pipes so deep as to necessitate the stoppage of all pumping until they can be dug out of the bed of the river. In the last heavy floods, engines, engine-houses, pumps, and everything else were either washed away or covered in silt to such a depth as to seriously militate against their use for some time. This was, of course, very exceptional; the river at that time rose upwards of fifty feet above its usual level, and the valley being so narrow the force of the water was almost irresistible. It is to be hoped that it will be some time before such a disaster again visits this fertile spot.

A strikingly valuable asset of the district is shewn most prominently in the valley of the Klein River, and that is the existence of large deposits of exceedingly rich limestone in the watershed feeding this river system. On the beautiful farm of Mr. John Young, in the Klein River, there is a mountain range which practically consists of little else but almost pure carbonate of lime. It is so rich that the manufacture of cement has been seriously contemplated. It cannot be surprising that the lands watered from such a region are abnormally rich and productive. Mr. Young is one of the old-time irrigators, who has harnessed into his service everything he can, as he has both gravitation and pumps at work. A very creditable piece of work is a lengthy piece of fluming which he has constructed to carry the waters of his furrows across a rather deep depression.

A feature that strikes one as shewing a deficiency, from Hankey down the river, is the fact that so few of the farmers have attempted to raise lucerne. The conditions are most suitable for this crop, and it should prove a valuable stand-by later on. Another is the comparative absence of stock. Ostriches are farmed very successfully, and the cultivation of lucerne is gradually spreading to meet the needs of the birds. An earnest attempt should also be made to introduce paspalum grass here, as it would enable the farmers to carry more stock and thus divide their interests a little more evenly. The whole valley is making great strides now that railway communication is assured, and the day should not be far distant when its producing powers must have a decided influence on the markets.

NODULAR DISEASE OF THE INTESTINES OF SHEEP, OR "KNOOPEN IN DE DARMEN."

By D. HUTCHEON, Director of Agriculture.

Sheep farmers have observed these peculiar cheesy-looking nodules in the walls of the intestines of sheep for a number of years. They are thus referred to in the Report of the Commission on the Diseases of Stock, 1877:—"It appears that the knots in the intestines, which immediately indicate the presence of parasites, have been seen for many years past, but they appear not to have done any serious damage, or to attract any particular attention."

During 1889-90, I carefully examined a great number of these caseous or cheesy nodules, but I failed to obtain any clear evidence of their parasitic origin, although I felt convinced that they were due to parasites. But, in December of the latter year, I received a copy of the report on the "Animal Parasites of Sheep" by Cooper Curtice, D.V.S., M.D., published by the United States Department of Agriculture. In this work, Dr. Curtice describes the originating cause of these nodules for the first time. He says:—

"The cause of this disease remained until the winter of 1888-89 in obscurity, but owing to a favourable combination of material and methods of investigation it was then ascertained. Some of the large soft tumours, which are characteristic of this disease, were dissected from the intestine, and after being slit open, their greenish cheesy contents escaped in a watch-glass of water. By carefully teasing the apparently newer portion of these masses, a little worm, the cause of the trouble, was found." Dr. Curtice calls the worm *Aesophagostoma columbianum,* and there is no doubt from his detailed description, illustrated as it is by beautifully executed drawings, that the worm which he describes is identical with the small white worm which is found in the large intestine or "kransderm" of our sheep, wherever these nodules in the intestinal walls are found. I may just mention that I have since found the same nodules and the same worms in the intestines of young oxen in the Eastern Province.

Dr. Curtice says:—"The life history of this parasite seems to be completely known to us during its development from the immature form found in the intestinal tumours to the adult stage, but there is a period from the moment when the eggs escape from the intestine with the excrement to the time when it is found again in the intestinal tumours that must remain in obscurity. After the embryo has returned into the alimentary canal, it makes its way through the mucous coat of the intestine, and becomes encysted there."

The doctor has been unable to learn how it passes through the mucous coat, as even on the youngest specimens no sign of armature is found.

"The very young forms found in the cysts shew little differentiation beyond what they could have attained in the egg-shell. They are soon surrounded by a cyst which seems to belong to them, and to have been created by them; but whether this cyst is the remains of a moult or not cannot be asserted. Later in their history they become surrounded by the products of the inflammation they excite in the surrounding tissues, and eventually break from the cyst and live in the cheesy mass of the tumour In this stage of their growth the worms exhibit the intestine and oral cup and indistinct unicellular glands They then moult, and shew all these features in more distinct outline. Having attained a length of from 3 to 4 mm., or less than one-sixth of an inch, they break from the tumours to begin their life in the intestine. In the intestine they continue their growth, and becoming sexually perfect, produce eggs which eventually go through the same cycle." Such is Dr. Curtice's description of the life history of the worm which produces the caseous nodules in the intestines, which may be roughly summarised for the benefit of the Colonial farmer thus:—The small white worms which are found in the large intestines of sheep are the fully matured worms, male and female, which cause the cheesy nodules in the walls of the intestines of sheep which are so numerous in many districts of the Colony. The female worms lay a large number of eggs which pass out with the droppings; what changes these eggs undergo from the time that they pass out with the droppings until the young embryo is found in these nodules in the walls of the intestines, are not yet known.

The life history is, therefore, as yet incomplete, but I am confident that any future discoveries respecting this intermediary stage will confirm Dr. Curtice's views that the immature worms found in these nodules are the embryos of the small white worms found in the large intestine. These worms are invariably present wherever the nodules are met with. I was myself inclined to connect them with these nodules some years ago, but the small number of worms in comparison with the immense number of nodules made me doubt the connection.

In ordinary seasons these nodules are confined to the large intestines principally, and when such is the case, they do not appear to interfere to any serious extent with the health or condition of the sheep, but, as already stated, I have examined a large number of sheep in which these nodules were so numerous on every part of the intestines that there was hardly an inch of sound gut to be found from the stomach to the anus. The whole bowel being in a state of chronic inflammation, the wonder is how the affected animals can live until their bowels arrive at such a state. In the Hope Town district I believe that these nodules in the intestines had as much to do with the heavy mortality amongst the sheep there as the so-called wire-worm *Strongylus contortus* in the stomach, although the latter were very abundant. Further, even when all the living worms, both in the stomach and bowels, are expelled, the sheep cannot be expected to thrive with the whole of their intestines filled with these nodules, hence the dissatisfaction often expressed with the results of dosing for the destruction and expulsion of these two kinds of worms. I do not know of anything that will kill the embryos in these nodules and restore the bowels to a healthy condition. We can, however, expel the living worms, and we can also, by the use of certain remedies such as mixtures of common salt, lime and sulphur, to which can be added a little of either sulphate of iron, sulphate of copper, or Cooper's powder. In the majority of sour veld farms a small quantity of lime is as essential to the healthy nourishment of the animal tissues as common salt, while sulphur is equally necessary to the growth of the animal's fleece. The salts of iron, copper and arsenic are added principally for their medicinal properties and their special action on the different animal parasites which infest our small stock, hence they should be given in small quantities and for limited periods, and may, with advantage, be given alternately.

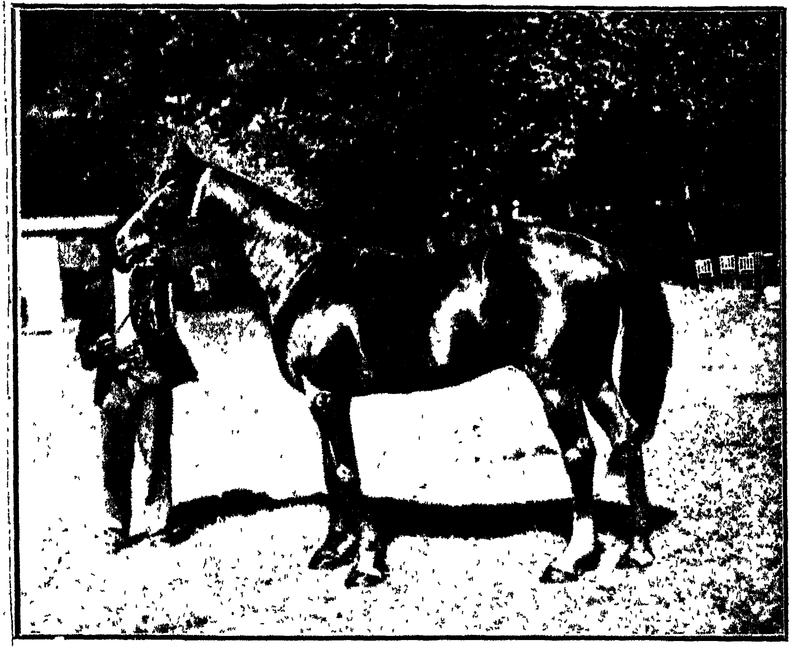
Rekziekte, Invagination, or the Slipping of one Portion of the Bowel into the Portion immediately Behind it.

This pathological condition is called "Rekziekte," because the affected animal strains and stretches itself as if its back were affected, in order to try and relieve the obstruction of the bowels. It is really a sequel to the invasion of the walls of the intestines by the parasite cysts above mentioned. How these cheesy nodules lead to twists, knots and invagination of the bowels, I may remark that when these nodules become very numerous, and closely packed all round the walls of the intestines, which they are very often, they tend to paralyse that portion of the bowel. The muscular movement of the bowel being thus seriously affected, the fœces are not moved onwards properly, and constipation supervenes. This leads to the animal straining considerably to force the fœces through the diseased and partially paralysed portion of the bowels. It is this straining which forces the portion of bowel in front of this diseased portion into the latter, where it becomes fixed, and blocks up the passage completely. In some instances twists or knots of the intestines occur, in others a portion of bowel becomes forced through a rent or tear in the mesentery, but in the majority of instances the condition is one of invagination—one portion of bowel forced into the portion immediately behind it.

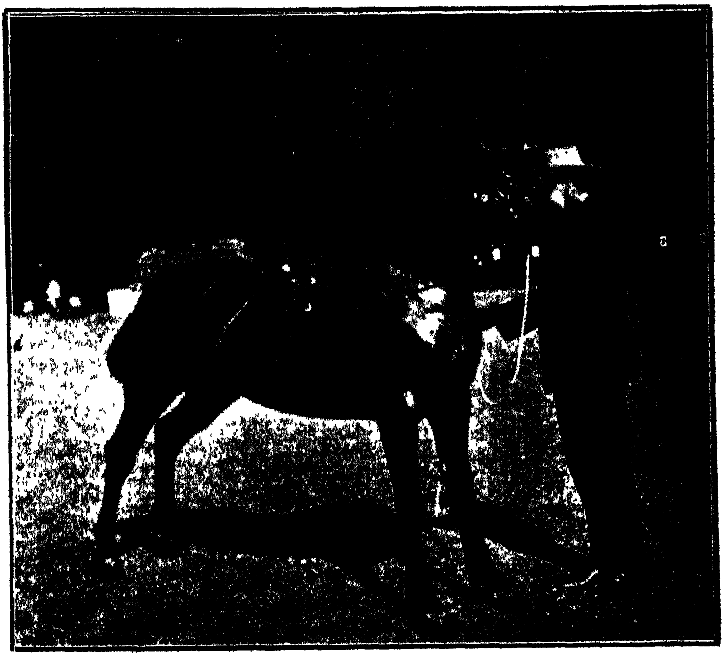
I need hardly add that there is no cure for such cases; and if the symptoms can be recognised with any certainty, the best plan would be to kill the animal, and convert its flesh into food at once. Preventive measures are the only measures that hold out any hope of success, and these consist in adopting every known means to keep the sheep free of these internal parasites—such as purifying the water supply by preventing the stock from contaminating the dam water, by railing the dams off and leading the water into troughs, by using spring or well water where such can be procured, by grazing the several portions of the veld alternately by different classes of stock, etc.

Return of Fruit Shipped from Cape Town to England During December, 1906, and January, 1907.

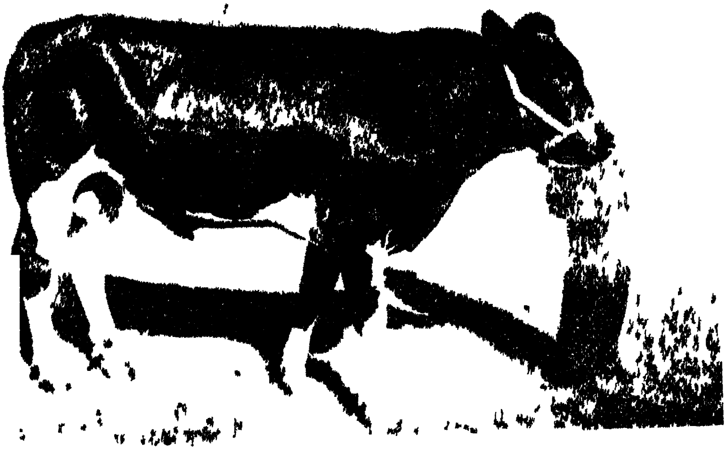
Date.	No. of Packages.	Description of Fruit.	Quantities.	Value.		
				£	s.	d.
Dec., 1906..	2,276	Peaches . ..	15,622	341	16	0
,, ..	233	Apricots	1,700	23	15	0
Jan., 1907..	10,927	Plums ..	250,278	1,264	7	8
,, ..	5,828	Peaches ..	135,912	828	17	0
,,	5,112	Pears	132,830	766	7	0
,, ..	1,095	Apricots	21,350	114	0	0
,, ..	782	Nectarines ..	15,620	95	7	0
,, ..	30	Apples .. .	675	5	13	0
	26,278	Total for two months	603,587	3,440	2	0



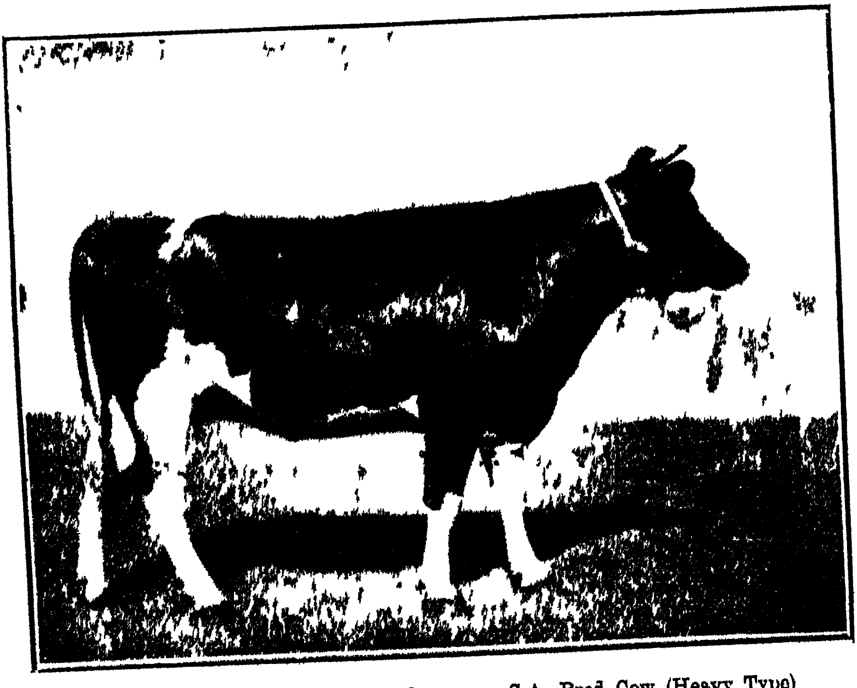
Mr. Ruperti's Thoroughbred "Damocles," the Rosebank Champion.



Mr. A. G. H. Kotze's Flemish Stallion "Thomas," 1st at Rosebank.



Mr H Kennedy's Rosebank Champion, S A Bred Bull (Heavy Type)



Mr. E. H. Mellish's Rosebank Champion, S.A. Bred Cow (Heavy Type)

THE AGRICULTURAL SHOWS.

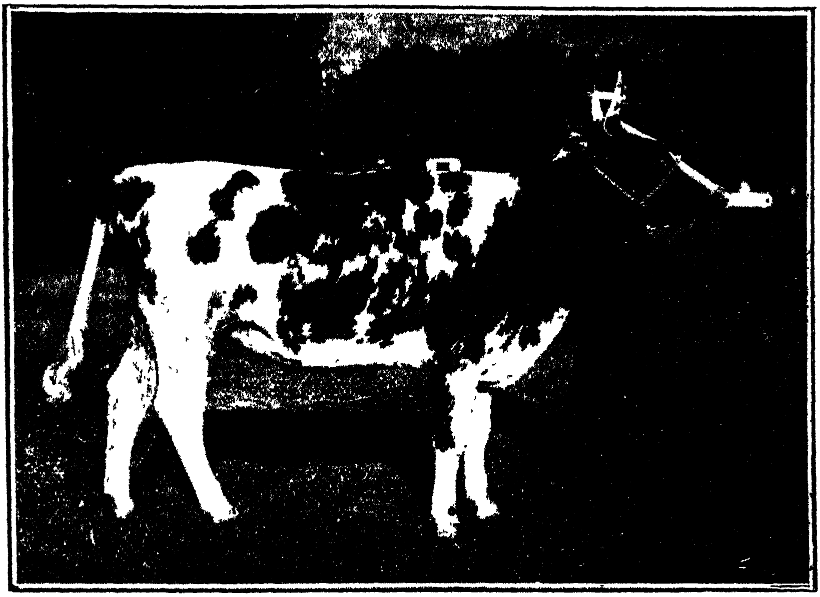
The end of February saw the practical completion of the Western series of Agricultural Shows, and March ushers in the beginnings of the busy period in the Eastern, Midland and Northern sections. Aliwal North, Queenstown and Bayville are exceptions to the above, for though these Societies come into the regions of the Eastern Province, their shows were held in February, and all being largely dependent upon their immediate localities did fairly well. Even though Queenstown and Aliwal actually overlapped no serious mischief seems to have arisen.

The completion of the Western series of shows has helped to demonstrate very strongly the growing interest now being shewn everywhere in agriculture. The centres immediately round Cape Town, like Paarl and Stellenbosch, which are looked upon by many as merely an excuse for a day's outing, had much to show this year that was of a highly encouraging and hope-inspiring nature. In addition to the fruit and cereals, for which these two districts are so justly famed, the sturdy beginnings of what we all hope may some day prove an important industry—that of dairying—were very strongly in evidence. At the Paarl, the Frieslands were the principal feature in the dairying stock with a few Alderneys and Jerseys. The former especially were an excellent lot, and evoked much praise. At Stellenbosch the cattle lines included a very fine collection of animals, prominent among them being Frieslands, Ayrshire and Jerseys. Though the Channel Island representatives were not in very good condition, they were a good lot all round. But the Frieslands and Ayrshires, the latter mostly represented by Mr. Rawbone's well known herd, were a credit to the district. In fact, they would be a credit to any district, and it is most heartening to see such fine stock at a local show. The horses at both these shows were well up to the usual standards, while in pigs and poultry there were distinct signs of advancement. We have yet to appreciate the full value of the pig as a farm animal in this country, but it is encouraging to see such signs as there are of an awakening interest in this profitable adjunct to the farm yard. As a matter of fact in districts such as Paarl and Stellenbosch, the pig will yet be indispensable, for with orcharding and dairying, the place of the pig is well defined in the economy of the farm. As a consumer of the unconsidered trifles that always matter he is of value, and as a steady earner of regular dividends he is worth a good deal more.

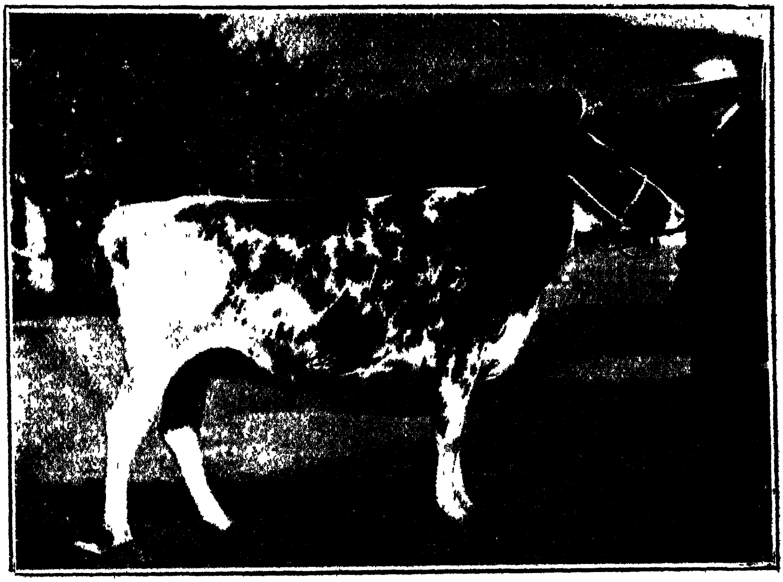
At Worcester, the fates were not quite so propitious this year, and some of the reports went so far as to write the fixture down as a failure. While not prepared to endorse so sweeping an assertion, it has to be admitted that more successful shows have been held in that enterprising centre. Again it has to be recorded that the cattle section was about the strongest and most interesting on the ground Horses, of course, were a strong feature, particularly in the breeding classes. One may not admire the general taste of the Worcester horse breeders in giving so much prominence to the Flemish types, but it has to be admitted that they make a brave show every year, and in time will undoubtedly hold a prominent position as a horse rearing section once more.

Bredasdorp came up smiling again on the 7th of the month with a particularly interesting local show that proved an unexpected success from every point of view. The stock exhibits were all round about the best the district could produce, and as most of the classes were well filled, the competition was keen. In horses, the entries were very full, the stallion classes bringing a good deal of competition. In sheep and goats, too, particularly the Merino and Angora sections, the number of contestants was more than satisfactory. Cattle and pigs were a good exhibit, though a little more classification in the prize list should bring about more interest.

Malmesbury and Robertson were held on the same day, the 13th a fact which could not have been of much benefit to either, although they are sufficiently far apart not to seriously clash. At Malmesbury a special effort was put forth, and with the assistance of Piquetberg a distinct success was scored. All the conditions were fairly favourable, and as a good prize schedule had been arranged for, the ultimate result was a foregone conclusion. Cereals and dairying may be written down as the prominent feature of these districts, and it is highly gratifying to be able to state that each of these was thoroughly well represented. In the cattle sections the exhibits were excellence itself, and reflected the highest credit even on a dairying district The principal breeds are the Friesland and Ayrshire, the former predominating, and keen was the competition for the prizes. There was a good show of horses, but nothing like what this district used to be able to put forward. With breeders like the Meleks and the Kotzes, of Berg River, to support the show, the section was bound to be acceptable; but something more is expected of a district with such traditions, and something much better should be forthcoming in the near future. The exhibit of cereals was so good as to extract high praise from the judges, who hoped this improvement would be continued. It is a lamentable fact that very little interest is shewn in these classes as a rule, even though they may be of vital concern to the districts interested. It is a good sign, therefore, to see both quality and quantity at a show like Malmesbury.

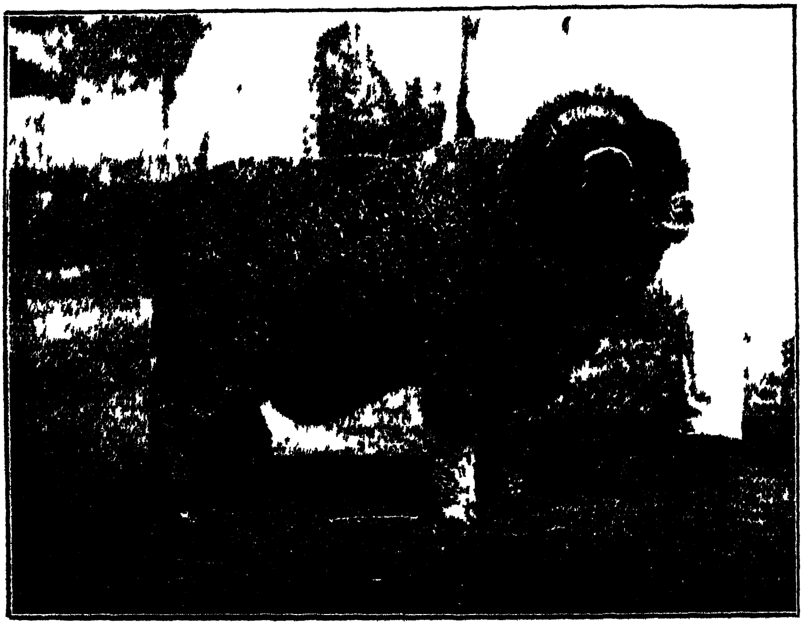


Mr. Rawbone's Rosebank Champion, Ayrshire Cow.



"Katie," another distinguished Ayrshire Cow of Mr. Rawbone's.

"Moore," 1st and Champion Robust Woolled Ram, at Rosebank and Aliwal North Owned by P. J Swingburn, Otterburn, Cathcart Rambouillet, bred in America and Imported by Messrs King & Church



Fine Woolled Champion Ram, at Rosebank The Property of Mr J H King, of Tarkastad.

Robertson again claims a success, and it must be admitted that they deserve it. The great feature at Robertson is always the horses. And this year was no exception. It is true that the Thoroughbred classes were poor, and the judges offered a useful suggestion when they advised the introduction of a few good Thoroughbred stallions to mate with the excellent mares of the district. The remount class also elicited encouraging comments from the judges. There was a good show of cattle, while sheep, goats, poultry and slaughter stock were also well represented.

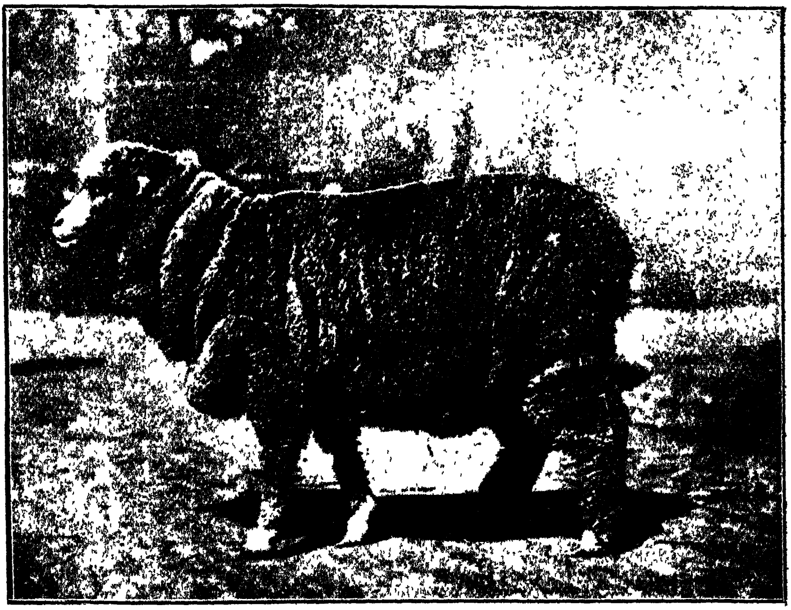
The Western Province Show at Rosebank this year filled the usual three days and a bit over, with plenty for the sight-seers to occupy themselves with. The weather was everything that could be desired, the attendance must have eclipsed all records, and the entries, numerically at least, were, we were given to understand, ahead of all previous shows. Yet with all these gratifying there were one or two rather disappointing features. These may be summed up under three heads, and they were a deficiency of quality among the horse classes compared with previous shows, a lack of exhibits of the staple industries of the Colony like wool and mohair, and an absence of really first-class exhibits of implements and machinery. It is very evident that the latter is due in a sense to the lack of space which is available. Year after year the demands are encroaching upon the limited ground that is left, and the day cannot be far distant when the Western Province Agricultural Society will have to seek more elbow room, or else be prepared to cut down some of its attractions. Nothing can go on expanding for ever without exceeding its bounds. That is what the Western Province Agricultural Society is trying to do. It is growing in size and importance year by year, and every provision is made for this except that of securing more space for show purposes. With plenty of room to show off the exhibits, there is no reason why Rosebank should not have as fine a display of implements and machinery, say as Port Elizabeth or East London, but this can only be attained by providing plenty of room. The stock, too, are beginning to get crowded. Two features of exceptional interest must be noted at this year's Rosebank Show, and these were the really excellent exhibit of sheep, and the fruit. The cattle are always good, and though this year they seemed even a little better than usual, the improvement is naturally not so noticeable as in the sheep. There was also a fine display of jack-donkeys, which indicates the rapid growth of the mule-breeding industry. Agricultural produce was a fairly strong feature, as also were the vegetables. One very attractive exhibit was that of ostrich feathers, but the wool and mohair in the same room were not at all representative. Space forbids further reference to this interesting event.

Ceres managed to put up another excellent effort this year, and the organisation can be satisfied with the result. With Tulbagh and Calvinia at the back of them, the Ceres people ought to shew us something very special when they get into their stride, for these sections are all important producers. All the stock were shewn in good and creditable condition, and the classes for horses, cattle and sheep particularly were well above the average. In dealing with the fruit, the judges remarked upon the large and excellent display. All the fruit staged, and especially the apples and pears, were of a high commercial value, and very much in advance of the similar classes last year. The absence of the codlin moth shewed that great care had been exercised with the fruit earlier in the season.

Riversdale was held on the same date as Ceres, and here also the fates were favourable, and as good a show as the district has yet seen was put forward.

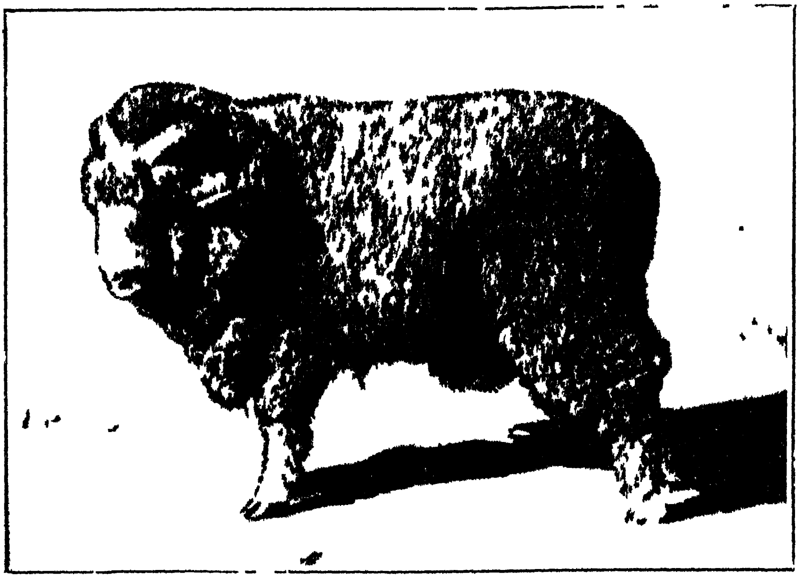
Caledon closed the month by holding its annual fixture on the last day. With a fairly good show ground that is being improved from year to year, Caledon bids fair to become one of the most attractive shows in the Western Province. It is near enough to Cape Town to make the journey worth taking, while the journey itself is sufficiently picturesque to make it attractive without the show. Caledon is a good and productive district, and it is gratifying to be able to note that its staple products were well represented. In horses, cattle, sheep and cereals, the show was richly endowed. The Merinos were an exceptionally fine lot and would do credit to any district. As a matter of fact, the sheep all through this Colony are improving much faster than is generally recognised, and before long we should be able to hold our own against all comers.

This was shewn by the exhibits of Dr. Smartt at the Rosebank Show. The pens of rams off the veld—and such veld at Britstown provides is scarcely the sort of pasturage to raise pampered stock on—were shown in excellent condition. Such an exhibit as that is the strongest possible argument in favour of supporting the big breeders' prize suggested by Dr. Smartt at the luncheon. We trust to see this prize worked up at an early date.



Fine Woolled Champion Ewe at Rosebank. The property of Mr. J. H. King of Tarkastad.

Champion Robust Woolled Ewe at Rosebank. The property of Messrs. Geo. King & Sons, Tarkastad.



A Karoo Veld-reared Prize winner. The property of the Smartt Syndicate

Group of Veld reared Rams from Britstown The property of the Smartt Syndicate

GUANO ISLANDS COMMISSION'S REPORT.

Cape Town, February, 1907.

The Honourable the Secretary for Agriculture:—

Sir,—The Commission appointed by you in terms of the resolution adopted by the House of Assembly on July 11th, 1906, to inquire into and report upon all matters relating to the general administration and working of the Government Guano Islands and the conditions necessary for the best and cheapest utilisation and distribution of guano within the Colony, has the honour to submit the following report:—

Evidence has been obtained from a large number of witnesses on the several matters requiring consideration, and the Commission has also visited Jutten Island and Malagas Island, in Saldanha Bay, as well as Sinclair's Island, Plumpudding Island, Possession Island, Halifax Island, and Ichaboe Island, in the Ichaboe Group.

Dealing first with the points specially mentioned in the letter of appointment, in the order therein given, the Commission has arrived at decisions in regard thereto as follows: (*a*) As far as can be ascertained, from the various estimates which have been submitted, the nett actual cost of guano has hitherto been about £5 per ton. The price at which it is sold to the farmers (£6 per ton, which includes free railage), compares very favourably with the price of imported fertilisers and its value as a fertiliser, generaly speaking, equals that of the best imported articles. It further appears that since the sale of the guano by the Government and its more extensive use, the cost of imported fertilisers has been greatly reduced. (*b*) In the absence of records, no exact data are available for calculating the cost of victualling the men employed on the islands; but, as far as the Commission has been able to ascertain, this may be put down at 2s. per man per diem. It may be here explained that the amount of 3s. 6d. per man per diem, which was stated to the Civil Service Commission by the late Superintendent as being such cost, was made up by including therein the expenditure on the upkeep of the Government schooner Seabird, and certain other items chargeable to the guano service generally. (*c*) As regards freights, the Commission considers that it would be more economical to call for tenders for a period, say of twelve months, for all the work required, beyond that which the Seabird can perform. The Commission does not favour the purchase by the Government of a steamer, as it is of opinion that the arrangement above recommended will suffice for all requirements. Should it be found impracticable to secure a charter for the whole year, the Commission urges that, instead of the verbal charters which have hitherto been thought sufficient, a written charter party should be entered into for each voyage, after informal tenders have been invited for the services required. (*d*) Guano contains all the essentials of plant food, but not in proper proportions for every kind of crop. As the quality of the guano from the several islands varies, owing mainly to the different nesting habits of the birds, and as it is desirable to sell guano of an approximate uniform quality, the Commission recommends that all the guano, including rock guano, should be mechanically mixed, so as to make it of an approximate uniform grade, and, further, that when the guano is sold, a certificate of the analysis should accompany each consignment, and that such information as may be possible regarding the additions necessary to render it suitable for use for different crops should also be supplied. The Commission does not approve of any attempt being made by the Government to prepare a complete fertiliser. (*e*) The Commission does not favour the extension or continuance of the system of country depots for the sale of guano. It appears that the maintenance of these depots has involved extra expense, and has resulted in waste of the guano, and that the sales have been limited; moreover, some of the causes which led to the establishment of these depots in the first instance, such as lack of sufficient storage accommodation in Cape Town, shortage of trucks, etc., have now either disappeared or been removed. In the opinion of the Commission, one general depot in Cape Town will best meet all requirements. In connection with this depot question, the Commission recommends that the concession of free railage, granted by the Government from January 1st, 1906, should be continued, and that the system known as C.O.D. should be brought into operation as a substitute for country depots. (*f*) From the evidence which has been adduced from the headmen of the islands and others who have had lengthy experience in sealing, it appears that the best time for having "knock-downs," *i.e.*, killing with clubs of adult seals, is when the seals take up on the islands during the pupping and mating season, which commences about the middle of October, and extends until about January; that the female seal becomes pregnant again almost immediately after pupping; that the shedding season commences about February and lasts for about two months; that the adult seals leave the islands after the shedding season, and do not return in any numbers until the pupping and mating season; and that the best time for taking pups and yearlings, whose skins, in the opinion of experts, supported by the evidence of the account sales, are the most valuable, is during the winter months. The Commission accordingly recommends that the close season should be from January 1st to June 29th, and the open season from July 1st to December 31st in each year. A solution of the question as to the desirability or otherwise of throwing open the sealing to private enterprise presents some difficulty. Some of the islands in the Colonial group, on or around which it has been proposed that sealing should be permitted, yield guano as well as seals, as, for instance, Dyer's Island, and great risk would be incurred of disturbing the birds were sealing on such islands to be permitted. The same remark applies to the islands in the Ichaboe Group, that is, those islands north of the Orange River, while as regards the islets and rocks included in this group, but belonging to Germany, which are leased to the Cape Government, it is open to question whether, under the agreement of lease, it would be competent to allow private sealers generally to work them. After mature deliberation, the Commission recommends that all such islands south of the Orange River as yield but little or no guano—namely, Robbenstein, Jacob's Rock, Elephant's Rock, Sea ledges Walker Point, near Knysna, Seal Point, near Plettenberg Bay, and Blackrock, near Bird Island, off Port Elizabeth, and all other similar islands and rocks—should be thrown open to the public for a term of three years, and that no sealing thereon be carried out by the Government during such period. In view of the position above stated as regards the Ichaboe Group, however, and considering the great likelihood of serious friction arising between the Government employees and private sealers should both parties carry out operations thereon at the same time, and, further, bearing in mind the difficulty of maintaining order in this remote locality, and the desirability of avoiding complications, the Commission does not see its way to recommend private sealing enterprise being allowed in this group. Among the general regulations to be framed for governing public sealing, the Commission recommends that provision should be made for the issue of a registration licence at a charge of £5 for each boat of 20 tons and under, and £25 for each boat above 20 tons; and further, for the payment of a royalty of 2s. per skin. It has been found that the method exclusively adopted by the Government employees for killing seals is clubbing; private sealers have recourse to netting in addition. While the former is the more expeditious and humane method, the Commission does not recommend that private persons should be prohibited from netting seals. It has not been found possible to obtain any exact data as to the amount of destruction caused by seals to fish and sea-birds. As to the alleged damage to the fishing industry by seals in Colonial waters, the Commission is of opinion that when private sealing comes into operation all cause for complaint on this head will disappear. The Commission has, as desired, given careful consideration to the financial aspect of the sealing question. The concession recommended to be made to private sealers, as already described, will undoubtedly result in a direct loss to the Guano Islands' revenue, but in view of the anticipated benefit which the throwing open of sealing will confer on those who will embark in the enterprise, the Commission considers that the sacrifice is warranted.

Coming now to the question of the general administration and working of the islands, the Commission, after a thorough investigation at the several islands visited, finds that the health and physical condition of the headmen and employees are in every respect satisfactory. No complaints were made as to the accommodation or the quality or quantity of the food, except (1) a trivial one at Malagas Island in regard to the coffee; (2) a representation, which was general, as to a deficiency of fresh vegetables; (3) a complaint that the prices charged by the captain of the Government schooner Sea Bird for clothing, etc., supplied from the slopchest of the vessel are excessive. The first of these matters was adjusted on the spot. As to the second, the Commission strongly urges that the quantity of fresh potatoes and onions be largely increased, and that pumpkins be added, on the grounds both of health and economy. With respect to the third matter, the Commission, while recommending that the sale of "slops" from the Sea Bird be continued, considers that the articles should be sold at scheduled prices to be fixed by the Superintendent of the islands, and that the captain of the vessel should have an addition made to his salary as compensation for the loss he will sustain in consequence of the change. It would appear that with the exception of Mr. P. Truter's visit in November, 1905, the islands in the Ichaboe Group have not been visited by the Superintendent, nor by any member of the head office staff or other official for over three years. The Commission considers this to be very inadequate supervision, and recommends that inspection by the Superintendent or his deputy should be made at least twice every twelve months.

There are a few other matters which call for attention, and the following recommendations are urged for adoption: (1) The extension to the headmen of the principle of a capitation grant towards the cost of schooling for their children, as in the case of the children of lighthouse-keepers and foresters; (2) the supply of more reading matter, *i.e.*, newspapers, periodicals, as well as draughts, etc.; (3) the extension of the landing stage at Malagas Island; (4) the improvement of the accommodation at Sinclair's Island, more especially of the galley and sleeping bunks; (5) the reversion to the practice of loading the guano in bags instead of in bulk; (6) the killing of a larger number of seals in the winter months of the open season as compared with summer; (7) the continuance of the system of the employment of the wives of the native workmen in cleaning the guano instead of its being riddled by men, the former course being more economical and giving better results; (8) that whenever practicable the guano should be removed as soon as possible from the island to the central depot in Cape Town.

The Commission further strongly recommends: (1) That no guano be exported oversea unless the production greatly exceeds the demand, and unless there is no likelihood of the surplus guano being required in the Colony; (2) that the revenue derived from the working of the guano islands should be kept separate, and should not be merged in the general revenue; (3) that a laboratory should be provided and placed under the direction of an analyst, who should be an officer of the Guano Department, whose duty it would be to analyse the guano and other fertilisers and manures, as well as carry out analyses of soils, the expenditure necessary for these purposes to form a first charge on the profits of the working of the islands; (4) that after carrying out the recommendation last described the surplus on the profit should be devoted to lowering the price of guano.

The Commission has much pleasure in testifying to the excellent manner in which it found the islands being worked.

Finally, the Commission wishes to express its satisfaction and appreciation of the able services rendered by the secretary, whose knowledge of the subject, in all its bearings, has been of very great assistance.—We have, etc.,

J. SEARLE, Chairman,

A. J. VILJOEN,

THEO. L. SCHREINER.

BARRY MCMILLAN, Secretary.

AGRICULTURAL SHOW DATES, 1907.

King William's Town, on Thursday, February 28 and Friday, March 1.

East London, on Thursday, Friday, and Saturday, March 7, 8, and 9.

Barkly East, Wednesday, March 13. Judging on Tuesday, March 12.

Cathcart, on Wednesday, March 13.

Molteno, on Tuesday, March 19.

Richmond, on Wednesday, March 20.

Glen Grey, at Lady Frere, on Wednesday, March 20.

Humansdorp, on Wednesday, March 20.

Bloemfontein, on Tuesday, Wednesday, and Thursday, March 19, 20 and 21.

Oudtshoorn, on Wednesday, Thursday, and Friday, March 20, 21, and 22.

Umtata, on Wednesday and Thursday, March 20 and 21.

Mafeking, on Wednesday, March 27.

Midland Agricultural Society (Graaff-Reinet), on Tuesday and Wednesday, March 26 and 27.

Wodehouse Agricultural Society, Dordrecht, on Wednesday, March 27.

Bathurst, Wednesday and Thursday, March 27 and 28.

Butterworth Farmers' and Traders' Association Show, on Thursday, March 28.

Cradock, on Tuesday and Wednesday, April 2 and 3.

Kokstad, on Tuesday and Wednesday, April 2 and 3

Albany Agricultural Society, at Grahamstown, on Thursday and Friday, April 4 and 5.

Cape Flats Farmers' Show, Wednesday, April 3.

Elliot, on Wednesday, April 10.

Port Elizabeth, on Wednesday, Thursday, and Friday, April 10, 11, and 12.

St. Mark's Agricultural Society, at Cofimvaba, on Thursday, May 23. Postponed from March 8.

WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION.

Record of Eggs laid from 18th June to 28th February, 1907

Pen No.	Breed.	Pullet No.	1st to 28th Feb		TOTAL PER PEN.	
			Eggs.	Points.	Eggs	Points.
	Buff Orpingtons ..	1*				
		2	13	26		
		3	10	13		
		4	12	24	350	672
	Partridge Wyandottes	5				
		6	13	17		
		7	6	11		
		8	6	12	311	521
3	White Wyandottes ..	9	13	26		
		10	13	26		
		11	14	28		
		12	8	16	512	979
4	White Leghorns ..	13	6	12		
		14	16	19		
		15	1	2		
		16	22	42	586	987
5	White Wyandottes ..	17	16	32		
		18				
		19	6	11		
		20			418	755
6	Buff Orpingtons	21	12	24		
		22*				
		23	6	12		
		24	15	30	355	703
7	Plymouth Rocks ..	25	9	14		
		26	7	11		
		27	15	29		
		28	13	17	466	752
8	Buff Orpingtons	29	11	19		
		30	12	21		
		31	16	32		
		32	6	11	362	672
9	Brown Leghorns ..	33	16	32		
		34*				
		35	5	10		
		36	18	36	411	793
10	Buff Orpingtons ..	37	11	21		
		38	10	20		
		39	8	16		
		40	12	22	414	791
11	White Leghorns ..	41	10	20		
		42				
		43	12	24		
		44	18	34	402	789
12	Buff Leghorns ..	45*				
		46	17	33		
		47				
		48*			334	619

*Dead.

Western Province Agricultural Society's Egg Laying Competition—*continued.*

Pen No.	Breed.	Pullet No.	1st to 28th Feb.		TOTAL PER PEN.	
			Eggs.	Points.	Eggs.	Points.
13	Buff Orpingtons ..	49*				
		50	5	9		
		51	10	20		
		52	13	24	401	772
14	Buff Orpingtons ..	53	12	24		
		54	9	10		
		55	6	12		
		56	9	18	441	809
15	White Wyandottes ..	57	12	15		
		58	8	16		
		59	8	15		
		60*			313	516
16	Black Orpingtons ..	61	8	16		
		62	8	16		
		63	14	27		
		64	16	32	378	752
17	Buff Orpingtons ..	65	11	22		
		66	8	13		
		67	9	11		
		68	3	6	344	581
18	White Leghorns ..	69				
		70	19	38		
		71	12	24		
		72*			443	852
19	Brown Leghorns ..	73	1	2		
		74	17	34		
		75	17	22		
		76	14	28	481	836
20	White Leghorns ..	77				
		78	7	14		
		79*				
		80	18	32	360	695
21	White Leghorns ..	81	7	14		
		82	13	26		
		83				
		84	15	25	247	470
22	Buff Orpingtons ..	85	7	14		
		86	6	12		
		87	11	17		
		88	12	17	385	601
23	Buff Orpingtons ..	89	16	24		
		90	11	20		
		91	10	20		
		92			428	790
24	Plymouth Rocks ..	93	11	14		
		94*				
		95	16	18		
		96	11	19	327	482

In scoring, 2 points are given for every egg weighing over 1¾ ounces, and 1 point for every egg weighing 1¾ ounces or less.

* Dead.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible.

All letters or contributions should be plainly addressed: "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication.

American Potato Blight.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—With regard to the disease in my potatoes ("American Potato Blight," as you call it), I have the pleasure of submitting the following report:—

I treated part of my seed potatoes in the manner recommended by your Department *viz.*, half pint of formalin to fifteen gallons of water. In digging up the potatoes they proved to be beautifully healthy.

My fellow-farmers about here advised me to sow salt, and the crop thus treated is as healthy as that for which formalin was used. The salt is sown fully twice the thickness of ordinary seed oats.

I also planted a plot without treating it in any way, and the resulting crop is badly affected by the "Scab."—Yours, etc.,

M. J. VAN NIEKERK.

Molen River, District of Ceres,
February 18th, 1907.

Stink Clover.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Enclosed you will find the leaves, seed and flower of a bush that has sprung up in my lands. It resembles lucerne very much in the leaf; the difference is in the seed and flower. The seed is each covered separately, and runs along the stem. It is a very abundant seeder, as one pound of seed could be taken off one bush. Its flower is white, and it grows to about five feet to six feet high. Kindly let me know what the bush is and if it is of any use for feeding so as to enable me to destroy it before it becomes a weed, if it is of no value, and oblige.—Yours, etc.,

HOUGHAM ABRAHAMSON.

Long Hope, February 10th.

The specimen plant forwarded has been identified by the Curator of the Herbarium as *Melilotus indica*, All—(*M. parirflora*). It is usually recognised in this Colony as "Stink Klaver," and is supposed by some to be detrimental to lucerne lands. In Australia, however, it is looked upon as a fodder plant of some value, also in some parts of Europe, where it is known as Melilot. It is an annual, and will yield to the mower. It has been known for years in this Colony, and is believed to be indigenous. It makes very heavy growth in moist seasons, especially in oat fields in some parts of the Eastern Province. It has then been mown in the usual way, and has made excellent hay. It gives the forage sheds a very pleasant smell. But why it is called "Stink Clover" is one of the mysteries of rural nomenclature in South Africa. It is not a clover at all, and the "stink" or scent is really that of new-mown hay.

Cheddar Cheese Making.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have before me Mr. Silva-Jones's pamphlet on Cheese-Making (Cheddar). I take it from this it is absolutely necessary for Cheddar cheese-making to milk night and morning. Is this so?

Now, if night and morning milking is necessary for Cheddar, it would be impossible for me to do so at present, but as I wish to try cheese-making, is there any other good make of cheese that one could proceed to make immediately, or almost immediately, milking is finished? If so, could you describe same in your next issue?

My reason for asking is, the part where I am is quite a young country—farms owned by young beginners, and very few of these farms are camped or convenient for night and morning milking—also, although far from market (no railway) I have made a success out of butter-making, but the transport question is a terrible bug-bear, and might break down at any moment; hence my wishing to go in for cheese-making.—Yours, etc.,

HAY.

Hay District, January 22nd.

The following reply was posted:—It is not essential to have night and morning's milk together for Cheddar cheese-making. By using only the morning's milk you will require to resort to the use of a starter, in order to induce the proper form of acidity prior to rennetting. This starter is often provided in the form of the whey from the day before. But it is not to be recommended. A lactic acid starter in powder form can be purchased with the fullest instructions how to use it. This form of starter gives most excellent results. Without the use of such starter in using only morning's milk very considerable delay is caused in waiting for the milk to correspond to the rennett test, which is the test used for finding when the milk is in a fit condition of acidity for rennetting. Cheese made with the aid of a starter is considerably better, and gives more even results than that made without it.—R. SILVA-JONES, Government Dairy Expert.

Unknown Disease among Sheep at Maraisburg.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I beg to inform you that a strange, or, at all events, a, to me unknown, disease, has made its appearance amongst my stock. In December last I suddenly noticed that two of my sheep, which were quite fat, began to fall off in condition, breathing most laboriously as if exhausted. I administered them each a dose of Stockholm tar, but without any result. The animals grew worse, and, after an illness of about a month, succumbed. I opened them, and found their abdomen full of lung-material, which seemed to be in a far-advanced state of decomposition. I discussed the matter with two of my neighbours, and heard, to my amazement, that the disease was prevalent amongst their flocks also. It is not Jagtziekte.

You or any of your readers would greatly oblige me by letting me know the nature of this disease, and which remedies to apply. Thanking you in anticipation.—Yours, etc.,

P. J. VENTER.

Kafferslaagte, District Maraisburg, February 7th, 1907.

From the symptoms described, the disease would appear to have affected the lungs. Although it is stated that the disease is not Jagtziekte, there is another disease somewhat similar to Jagtziekte, termed *Actinomycosis*, which may have been the cause of the death of these two sheep. There is not much to be done for them, as the disease is nearly always fatal. I shall be glad, however, if you have another case, to receive a portion of the diseased part and some of the fluid in a small bottle for examination. If you send a piece of lung, place it in a small jam jar, and fill with half brandy and water.—J. D. BORTHWICK, Chief Veterinary Surgeon.

Horse in Low Condition.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have a horse in very low condition which I am unable to fatten. He runs all day long in a lucerne paddock, gets watered twice a day, and at night gets as much dry hay as he can eat, as well as a quantity of molassine meal. A fortnight ago I gave him a bottle of raw linseed oil. The horse is quite lively and fit, and feeds well. He is aged about ten years and had an attack of "Nieuweziekte" some months back, but is quite well again, apparently. Although I know it is difficult to prescribe for an animal that one has never seen, I would be glad if you could make any suggestion which would enable me to get him into better condition.—Yours, etc.,

FARMER.

Middelburg, C.C., February 14th, 1907.

The cause is probably the after effects of the attack of "Nieuweziekte," for which I would advise you to give him the following tonic:—

Powdered Sulphate of Iron	8 drachms.
Powdered Gentian Root	2 drachms.

Mix into a powder, and give one dose daily in a small bran mash until the horse has had twelve doses.—J. D. BORTHWICK, Chief Veterinary Surgeon.

The Vitality of Ticks.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have from time to time noticed in your *Journal* different methods brought forward for the *extermination* of ticks, so I send you under separate cover a small box containing ticks and eggs for examination, and which, with the following explanation, will, I think, be very clear.

Had it not been that enclosed specimen was, along with others, developed under my own personal supervision, I confess I would have had difficulty in crediting it.

On the 6th August, 1906, I collected 120 blue female ticks, full of blood, and also a few male ones, from horses. I then thoroughly submerged the one half of them in McDougal's dip, 1-45, and the others in strong tobacco water keeping them in the dip for three minutes, and placed them ten in each matchbox, keeping the lots separate.

Three weeks afterwards they were all shrivelled up and dead, so I paid no more attention to them.

On Friday, the 8th February, 1907, I took them in order to throw them away; indeed, I had already burned six of the boxes, when, on opening one, I was amazed to see a living mass of young ticks and eggs. Indeed, it seemed to me such an unusual thing that I decided to send you a specimen.

1st. Those ticks were dipped and put in the boxes on 4th August, 1906.
2nd. The male ticks were dead, dried up, and done with in three days.
3rd. The female ticks seemed to be dead in three weeks from dipping.
4th. Six months and four days afterwards I find the boxes, each containing a mass of living ticks and eggs.

I should like to know if it is not a harder job than is generally supposed to *exterminate* ticks.

I firmly believe that the mothers of these young ticks (and which you will see amongst the eggs), were dead at the end of last August.

I offer no further remarks, but would be glad to have your opinion.

A short time ago there was, in a Natal paper, an argument between two eminent men as to whether or not ticks laid eggs at all. I think this would settle that point.—Yours, etc.,

JOHN W. BONNAR.

Upper Umzimkulu, February 20th, 1907.

This correspondent simply affirmed a fact well known to most farmers in the parts of the Colony where warfare against ticks is seriously waged, namely, that ticks are practically unharmed by some preparations which are fatal to scab, fleas and lice. Male ticks are short-lived when pulled from an animal after they have performed their main function in life, and those pulled and put aside in the present case would doubtless have died quite as quickly if they had not been dipped. The females, however, had their full meal of blood to convert into eggs and, being unharmed by the treatment accorded them, and quite content with the quarters given to them, they had merely lapsed into the natural quietude that precedes egg-laying when they were mistaken for dead ticks after three weeks. Doubtless, they had changed colour somewhat, and had shrunk a little behind, but if they had been taken into good light and carefully observed, life would have been evident. If they had been examined a few weeks subsequently, the process of egg-laying might have been witnessed. It generally extends over several weeks. Each egg issues separately, and is pushed to the front by the mouth parts in a slow and most methodical manner. I have often watched the operation and the rhythmic movements involved remind me of the unloading of cases from a ship's hold by a swinging crane. The correspondent may rest assured that his ticks, lifeless as they appeared to him when he looked at them, laboriously extruded each and every one of the thousands of eggs that he saw six months later. In connection with the work of this Branch, fifteen different kinds of ticks have been reared from start to finish, so we ought to know something of their habits. The particular kind of tick under discussion is a species of *Rhipicephalus*, which has not yet been officially named and described, but it was amongst those studied. It is larger and develops more slowly than the common blue tick of cattle to which it is allied. Both its moults are passed on the animal, and from "seed-tick" stage to full fed female takes about forty days. If the correspondent wishes to kill ticks he should use either mechanically mixed paraffin oil and water, or an arsenical dip. Arsenite of soda, at the strength of one pound to twenty or twenty-five gallons of water, is now the most popular dipping mixture in the Colony. Carbolic dips at ordinary strengths are quite useless for the purpose. Even the exceedingly concentrated one known as "Cyllin," which for ordinary purposes is used at a fraction of the strength of other kinds, fails to kill the ordinary blue tick at the strength of one part to fifty of water, and that even when the ticks are soaked in it for two minutes.—CHAS. P. LOUNSBURY, Government Entomologist.

Suspected Senecio Poisoning at Bolo.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have a two-year-old ox sick, and have lost three cows. one ox, and about ten calves from five to ten months old within four months, to all appearance of the same disease.

I would be very thankful if you could give me any idea what it is, and advise me what to do. I will describe, as nearly as possible, the exact symptoms: The first sign of the disease was their eyes became wide and glary. Next they tottered in the hind quarters when walking. Otherwise they looked perfectly healthy—fed, chewed their cud and stretched themselves when rising up. In most cases they went on in this way for some days. Then they began purging and straining as if unable to pass dung and water, and to wander, which they kept up for two or three days, or until they fell and could not rise. Then they lasted for about six hours, seeming to suffer terribly, straining and groaning until the last. The average time they were sick was about six days. A few died within four days. On postmortem the particularly affected part was the gall. In most cases it was twice its normal size, fluid dark and thick, with a quarter of an inch of fat around it. The apron fat was of a yellow watery jelly. In some the liver and lungs were affected. In others these were perfectly right. In most cases the bowels were also affected, and they were full of dark blood. But the liver and lungs of nearly all the calves were affected.

We have tried calomel and linseed oil; some we gave turpentine and paraffin; others Epsom salts and dark sugar. This last one I gave a dose of tobacco and salt. Those I dosed with turpentine and paraffin stopped purging, passed a lot of black, hard dung, and lived the longest. But none recovered.

Will you kindly post me a reply as soon as possible, and oblige.—Yours, etc.,

PERPLEXED.

Bolo Head, February 5th, 1907.

The following reply was posted:—From "Perplexed's" description I am of opinion that the disease which is carrying off his cattle is very similar, if not identical, with that which was prevalent in and around Molteno some two years ago, and has since been spreading. Unfortunately, no reliable remedy has been discovered for this disease, when once the acute symptoms become manifest. It is very evident that the glassy, staring eyes, and the straddling action of the hind limbs, point to some disturbance of the nervous centres, produced by something the animal has eaten. The severe straining also points to acute irritation of the mucous membrane lining the bowels. With regard to treatment, reasoning from the symptoms, a brisk purgative is indicated to assist in expelling the offending material from the digestive tract. The next consideration is to combine it with some soothing sedative which would allay the irritation of the nervous centres and soothe the lining of the bowels. I would, therefore, recommend a dose of calomel immediately, combined with opium. For a full grown beast, place 60 grains of calomel dry on the back of the tongue, and wash it down with a little water which contains *one* ounce of laudanum. Eight to twelve hours after, give a bottle containing a mixture of equal parts of lime water and raw linseed oil and one ounce of laudanum. Repeat this latter dose every twelve hours. Keep the beast off the veld, and collect some grass or other suitable food for it while under treatment. —D.H.

Bind Weed.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I enclose specimen of weed that is giving me a good deal of trouble, and shall be glad if you can advise me how to get rid of it. I have tried digging it out, but without success, as the roots go deep and spread very much, sending up a large number of shoots. The more the ground is turned over the worse the weed becomes, as the smallest piece of root will grow.—Yours, etc.,

J. S. ROBERTS.

The specimen is identified by the Curator of the Herbarium as *Convolvulus arvansis*, L., popularly known as "Bindweed." It is a great pest, and the only way of getting rid of it is by persistent digging or ploughing, and harrowing, raking the trash together and burning it when dry. The smallest piece of root will strike, and that is why in digging over the ground everything should be raked out which can be got out.

Arsenical Dip for Goat Scab.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—As there has been considerable difficulty experienced in the curing of goat scab, both Angora and Boer, I am enclosing the following treatment, which I believe is a certain cure for goat scab, and I trust it will be tried by goat farmers and the result reported in the *Agricultural Journal*.—Yours, etc.,

A. D. MUIR,

Sheep Inspector, Wodehouse.

One pound arsenic, two pounds soft soap, two pounds caustic soda, boiled and mixed with thirty-two gallons of water.

Cure for Sponziekte.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Do you know of any cure for Sponsick? Of course, there is the preventive, *i.e.*, inoculation. But how about a beast when it has the disease? The reason why I ask is that I have a cure, and I am willing to try it on any beast with the disease; or, if any one would like to see the cattle that I have cured I am quite willing to shew them. I only give one dose and operate on them, and it is sufficient.—Yours, etc.,

L. B. WEBBER.

Market Square, Grahamstown, February 19th, 1907.

Evidently the old saw must be changed to read "cure is better than prevention."

Partial Blindness in Calves.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have a cow with her second calf, and there is something strange about both of the calves. During the day they both seem to have good sight, but as soon as the sun goes down they both appear to be blind, and the mother's sight is quite good.

I would be thankful if you could tell me, through the medium of your valuable *Journal*, the cause and a possible cure.—Yours, etc.,

W. A. BLAKE...

Zwartfontein, February 4th, 1907.

If there is no discoloration of the eye-ball (*cornea*), I would not apply any thing, but attend to their general health. Will be glad to receive further details.—D.H.

Jackal Extermination.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Could any of your readers kindly inform me whether it is practicable to completely exterminate jackals in a netted area, say, 5,000 morgen. The nature of the country within that area I do not think can be considered as affording much cover—about 500 acres constituting bush—other than scrub.

Thanking you for inserting this.—Yours, etc.,

G. CUMMING.

"Hilton," Grahamstown, February 15th, 1907.

Millions of Swallows and Spreuws.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have a fairly extensive Poplar bush. For two years past a visitation of millions of swallows and spreuws has become both disagreeable as well as injurious to the trees owing to their droppings. They disappear during the day and assemble every evening.

Can any of your numerous readers suggest any remedy to get rid of the pest?—Yours, etc.,

ERNEST C. WEAKLEY.

Woodlands, Steynsburg, February 19th, 1907.

Scab in Potatoes.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I have sent you under separate cover four potatoes suffering from some disease. Will you please let me know what it is, and how to heal it, and if it infects lands.—Yours, etc.,

B. L. WHYTE.

Fort Rixon, Rhodesia, February 18th, 1907.

The disease is one form of Scab. The following treatment is recommended:—Take eight fluid ounces (the customary bottle) of commercial formalin (40 per cent. strength), and add this to fifteen gallons of water. Soak the whole potatoes in this solution for two hours. If very dirty they should be previously washed in water. After treatment, put in clean boxes or bags, in which no scabby potatoes have ever been.

The above quantity will do about eight bags of potatoes. Plant in the usual way.—E.A.N.

RURAL REPORTS.

Aliwal North, 2nd Feb.—Weather very damp with continuous rains. Vines, all on Cape Stocks, doing well, Fruit satisfactory with no diseases or pests. Extremely good crop of cereals. Lucerne is not grown very much, but what there is in good condition. Stock generally in very good condition.

Barkly East, 13th Feb.—Good rains have fallen and the veld is in good condition. Fruit is scarce. Good crop of wheat and oats. The lucerne, which is fresh sown, is eaten by flies. Stock doing well.

Barkly West, 21st Feb.—Good rains have fallen, fruit and crops doing well. Stock also in good condition.

Bathurst, 12th Feb.—Very dry weather. Veld in fair condition. Crops suffering somewhat from want of rain. Stock doing fairly well.

Bedford, 1st March.—Rainy weather and veld in good condition. Mealies doing well and it has been a good year for heavy crops of lucerne. Cattle and goats doing well. Some fever among the sheep, and the ostrich chicks are not doing so very well on account of the moist season.

Burghersdorp, 15th Feb.—Weather very changeable with heavy winds. Veld in good condition also the vines. Cattle and horses doing well.

Clanwilliam.—Weather variable with average rains. Veld in very good condition for the time of the year. There are rumours that the Codling Moth is in the fruit, apples particularly. Lucerne doing well. Stock in good condition.

East London. 21st Feb.—Weather dry and windy. Crops somewhat light. Oranges and apples in good condition also bananas. Yellow peach poor. Trellis grapes fair. Grenadillas abundant. Stock in fair condition.

Fort Beaufort. 4th Feb.—Weather very hot and damp and the veld is in splendid condition. Fruit not at all a success. Wheat just finished reaping and seems very promising. Mealies looking fairly well but badly infested with stalk borer. All stock good and healthy except some flocks among which fever is prevalent.

Gordonia, 18th Feb.—Fair weather and the veld is looking very well except where the locusts have destroyed it. They (the locusts) are more plentiful this year than they have been for a long time. Average rainfall. Only a small quantity of figs and grapes and pomegranates. The mealie crop has been destroyed by the locusts. Stock generally doing well.

Griquatown, 4th Feb.—Heavy rainfall and veld in good condition. Fruit not on yet. Stock doing well.

Jansenville, 18th Feb.—Warm weather with heavy rainfall, and veld in very good condition. Insects are among the fruit. Good crops of oats and mealies, Stock in fair condition.

Kimberley, 4th Feb.—Weather warm with heavy showers of rain. Veld in good condition. Fruit coming on well, also vines. Fair amount of mealies. What lucerne there is is looking well. Stock generally in good condition.

King William's Town, 4th Feb.—Weather changeable with average rains and veld looking well. Wheat somewhat damaged by hail. Mealies and Kafir Corn doing well although suffering from grub. Stock in good condition.

Ladismith, 13th Feb.—Weather warm and dry with light rains. Veld in good condition. The fruit is badly infested with insects. Vines doing very well. They are chiefly on Cape stocks. Mealies doing very well also the lucerne.

Malmesbury, 15th Feb.—Weather warm and veld very dry. Fruit season doing well vines also in good condition. Wheat good, price low, oats bad, prices good Very little lucerne. Stock generally doing well.

Middelburg, C.C. 14th Feb.—Weather windy with good rainfall and veld in good condition. Fruit season good. Very few vines. Very small crops of wheat and oats. Lucerne doing well. Stock all doing well with the exception of ostriches the chicks not being very healthy.

Mossel Bay, 12th Feb.—Average rainfall and veld in good condition. Fruit and vines doing well. Good crops. Stock doing fairly well.

Oudtshoorn, 12th Feb.—Weather very dry, hot and sultry with very little rain. Vines doing well but that is not the case with the fruit which is very bad, the codling moth being present. Owing to the heavy rains in December the crops have not turned out quite so well as they might otherwise have done. Stock generally doing well.

Peddie, 5th Feb.—Weather dry, hot and windy and the veld is drying up rapidly. There is very little wheat and what there is is very poor. Mealies are suffering from drought. Stock doing fairly well.

Prieska, 1st Feb.—Weather hot and veld in good condition although covered with locusts. Good rains have fallen. Vines in good condition. Very little fruit but what there is is good, the same remark applying to cereals. Stock doing well.

Queenstown, 7th Feb.—Weather very changeable with heavy rainfall, Veld looking splendid. Fruit damaged by hail, frost and insects Wheat reaped but not thrashed yet. Mealies have been a good bit damaged by hail and locusts, Lucerne very good. Cattle, horses and sheep in good condition.

Riversdale, 16th Feb.—Weather rather hot with light rains. Veld in good condition. Vines doing very well. Very little fruit. Crops satisfactory. Stock doing well.

Robertson, 12th Feb.—Weather warm and veld in good condition for the time of the year. Vines promising except where affected by Phylloxera. The fruit season does not promise well owing to the damage done by the Codlin Moth. Good crop of mealies. Lucerne very good. Stock doing well.

Somerset East, 9th Feb.—Weather mild and veld in fairly good condition although some damage has been done by locusts. Cereals doing fairly although locusts are somewhat troubling the mealies. Stock in good condition. Maggots seem to be in all the fruit trees. The few trellis vines in town are all destroyed by black rust.

Steynsburg, 14th Feb.—Warm and windy and veld in fair condition. Fruit disturbed by insects. Cereals doing well. Stock in good condition.

Stutterheim, 12th Feb.—Weather variable and veld in good condition. Fruit plentiful. Vines affected by rust. Wheat poor. Oats plentiful, likewise mealies. Stock doing fairly well.

Tarkastad, 20th Jan.—Warm weather with average rainfall. Veld in good condition. Vines in good condition. Wheat fair, oast and mealies good. Lucerne seems to be doing very well. Stock generally doing very well.

Upington, 8th Feb.—Weather fine at present. The rains have been heavy and continuous and the veld is looking splendid. The vines which are all on Cape Stocks are very good and plentiful, fruit also being very good and fairly plentiful. Wheat fair but shews a large falling off from last season. Oats and lucerne doing very well, he same remark applying to stock.

THE TRANSKEI.

Cofimvaba, 2nd March.—Fine warm weather prevailed during the past month which, with occasional showers of rain, has done immense good to growing crops, and with a continuance of such weather during the current month the prospects of a good harvest will be fairly assured. The pasturage is good and abundant, and stock generally is in fine condition, unfortunately Redwater is prevalent in the district, there being 10 areas under quarantine, seven of which were quarantined during February. A case of Lungsickness also occurred, the beast dying, and the remainder of the herd has been quarantined. A case of Farcy was discovered in this village yesterday—the animal was at once destroyed and the owner's premises placed in quarantine.

Flagstaff, 1st Feb.—7·94 inches rain fell during the month, the heaviest since February, 1904. A severe thunderstorm was experienced on the night of the 27th.

January about 3 inches of rain falling in four hours doing considerable damage to the crops. A hut close to the village was struck by lightning and one of the inmates, a native woman, was killed. The pasturage is excellent, and stock of all kinds is in good condition. One case of red-water was reported. The infected herds have been quarantined.

Lusikisiki, 1st Feb.—The prospects of an abundant harvest remain good. The native crops look well. Plentiful rains are falling and the pasturage is excellent.

Matatiele, 31st Jan.—During the early part of the month the crops suffered from drought. Rainy weather set in about the 27th and about one and a half inches were registered. In some instances however the rain was accompanied by hail. Pasturage is good, and the growing crops promise a fair harvest. An outbreak of glanders occurred during the month which was promptly dealt with. The condition of stock is good and no diseases have been reported.

Mount Ayliff, 31st Jan.—Owing to the moisture in the atmosphere the heat has been very trying though the actual temperature was not excessive. Plenty of thunderstorms. The veld is in good condition. Vines doing very well and fruit fairly good. Very little wheat grown. Very fair crop of oats and the mealies and Kafir Corn very promising. Stock in good condition.

Mount Frere, 28th Feb.—There have been heavy rains during the month and much damage has been done to the mealies and the corn crop in parts of the district by hail. The weather seems to have set fair now, a few days' fine weather will do the crops good. All kinds of stock are in good condition. Outbreaks of lungsickness are still occurring. These are all directly or indirectly traceable to transport oxen from East London. Quite a number of Natives have inoculated with virus from the Veterinary Laboratory, Grahamstown, and more would avail themselves of this virus were the supply certain.

Nqamakwe, 4th March.—The past month has been very rainy with hot days followed by thunderstorms Consequently weeds have flourished, and the Natives have found considerable difficulty in keeping their lands clean. In some parts of the district the mealie crops have suffered from excessive rain and mists. There have been several outbreaks of lungsickness in different parts of the district. In other respects the condition of the stock is normal. No locusts have made their appearance.

Tabankulu, 9th Feb.—The past month has been most favourable for growing crops and the natives have been busily engaged in keeping down weeds in their extensive lands and a plentiful harvest of mealies and Kafir corn is anticipated. The rainfall in this village registered nearly 5 inches, No diseases in stock have been reported except a sporadic case of Red-Water which was dealt with.

Tabankulu, 1st March.—The weather during the past month has continued to be favourable for the crops; blight has, however, appeared in the Kaffir Corn crops. No diseases have appeared amongst stock, which is in excellent condition.

Umzimkulu, 11th Feb.—Abundance of rain fell during the past month all over the district and as a consequence all rivers are in flood. A few severe hailstorms visited various parts doing considerable damage to growing crops and orchards but doing no harm to live stock. The mealies are very promising, better than it has been for years, and there is every prospect of an abundant harvest. All descriptions of stock are healthy and the district is entirely free from disease. A case of glanders was reported from Riet Vlei, but on investigation by the Veterinary Surgeon proved to be neglected strangles. A case of farcy at the same place was discovered and the animal promptly shot.

Willowvale, 28th Feb.—The veld is in excellent condition. Copious rains have fallen during the month. Cattle in good condition, but quarter evil and lung-sickness are rather prevalent in the District. Most of the crops are looking well. A swarm of locusts has made its appearance along the coast, but efforts have been made for their destruction.

NOTES ON THE WEATHER OF JANUARY, 1907.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission.

The weather of January was characterised by a mean pressure slightly higher than the average; low mean temperature, the days being much cooler, although the nights were slightly warmer than usual; a high percentage of clouds, some moderately heavy rains penetrating well into the interior and causing floods over certain areas; an exceptionally large number of thunderstorms with some severe hailstorms causing a great deal of damage to crops and small stock; an increased frequency of fogs, with a few slight frosts and an entire absence of hot winds.

Division.	Mean Rainfall (1907).	Mean No. of days.	Average Rainfall (1891-1900).	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ..	0·94	5	0·88	4	+ 0·06	+ 7
South-West ..	0·41	3	0·51	2	— 0·10	— 20
West Coast ..	0·08	1	0·14	1	,, 0·06	,, 43
South Coast ..	1·82	8	2·14	7	,, 0·32	,, 15
Southern Karoo ..	0·74	2	0·98	3	,, 0·24	,, 24
West Central Karoo ..	1·40	4	1·35	3	+ 0·05	+ 4
East Central Karoo ..	1·98	7	2·22	6	— 0·24	— 11
Northern Karoo ..	1·88	5	2·21	6	,, 0·33	,, 15
Northern Border ..	3·03	9	2·62	6	+ 0·41	+ 16
South-East ..	4·24	12	3·91	10	,, 0·33	,, 8
North-East ..	4·21	12	4·50	10	— 0·29	— 6
Kaffraria	5·60	15	4·56	12	+ 1·04	+ 23
Basutoland ..	6·64	17	6·85	14	— 0·21	— 3
Orange River Colony ..	..	..	4·91	9	..	..
Durban (Natal) ..	3·02	17	4·74	..	— 1·72	— 36
Bechuanaland ..	4·73	13	6·13	10	,, 1·40	,, 23
Rhodesia	4·47	10	8·12	13	,, 3·65	,, 45

Precipitation.—The mean rainfall during January, deduced from the records of 324 stations, was 2·68 ins., falling on 8 days, being 0·21 ins.; or somewhat less than 9 per cent. above the average. This amount is a decrease of 1·62 ins. as compared with the previous month but is 0·89 ins.; above the mean for January, 1906. The accompanying table shews that this excess in the mean for the month was mainly due to precipitation being above the normal over the Cape Peninsula, West Central Karoo, Northern Border, South-East and Kaffraria, although a similar excess prevailed over portions of the North-East and Northern Karoo. The surplus varied from 4 per cent. over the West Central Karoo to 23 per cent, over Kaffraria. Elsewhere the mean divisional rainfall was subnormal by amounts ranging from 45 per cent. over Rhodesia to 3 per cent. in Basutoland. The *plus* amounts of the preceding month over the various divisions have now become *minus* quantities, except over the Cape Peninsula, the South-East and Kaffraria where there is a continued excess; there is a continued deficiency of rainfall in Basutoland, Bechuanaland and Rhodesia, but the Northern Border shews a surplus amount this month as against the deficiency of December last. The rains were most abundant in the North and East, even the River at Carnarvon being 4 feet above the usual flood-water mark, in fact higher than within the memory of the proverbial oldest inhabitant, the Hartebeest River at Van Wyk's Vlei was also in flood, the surrounding land being under water, whilst an unusually copious rainfall seems to have been experienced over the Orange River Colony. Notwithstanding the damage caused by floods, etc , over certain areas, the agricultural prospects over the greater part of the Colony are brighter and more promising than for many years past. An analysis of the individual records shews that the rains were fairly general and more uniformly distributed over the country than usual, only eleven (11) of the 324 stations reporting "Nil"; whereas 75 had 0.01—1 ins.; 74 had 1·01—2 ins.; 42 had 2·01—3 ins.; 38 had 3·31—4 ins.; 33 had 4·01—5 ins.; 25 had 5·01—6 ins.; and 9 had 6·01—7 ins.; and an equal number shewed a total of 7·01—8 ins. Of the remaining eight stations the maximum amount recorded was 10·42 ins. at Woodcliff; then in order come Katberg, with 9·92 ins.; Bazeya, 9·91 ins.; Evelyn Valley, 9·84 ins.; Leribe, 9·77 ins.; Hogsback, 9·18 ins.; Maclear (Gaol), 8·92 ins., and Maclear (Station) with 8·60 ins. A similar examination of the maximum precipitation in 24 hours shows that the amounts recorded were in no case exceptionally heavy, so that the floods reported must be ascribed to the general and wide-spread distribution of the rainfall rather than to unusually heavy downpours at any one place. Thus of 291 stations, 186 (excluding the 11 with "Nil") had maxima of 0·01 to 1 in.; 86 had 1·01 to 2 ins., leaving only eight (8) with more than 2 inches. Of these last the heaviest fall (2·77 ins.) occurred at Flagstaff on the 27th, the next largest amount being 2·68 ins. at Fort Cunynghame on the same date. *Thunderstorms* were unusually frequent and wide-spread, being reported from practically every portion of the Colony, and exceeding in number those of December, 1905. In all 956 instances were noted on 30 days, the only day on which this phenomenon was not reported being the 19th. These storms may be stated to have centred round four distinct periods, viz., the 1st, 5th to 8th, 13th to 16th and 23rd to 29th, those during the third period being more limited in distribution and less numerous than during the other three; the actual dates on which they were most numerously reported were, 1st, 5th, 8th, 15th, 23rd, and 26th to 29th, particularly during the four days last-mentioned. A native woman was killed by lightning at Aliwal North on the 5th. With these storms were associated unusually severe and destructive *Hailstorms*, sixty-six (66) cases being reported on 15 days of the month, most numerously on the 23rd and 26th to 28th. Judging by newspaper reports the havoc wrought by these storms would appear to have been much greater than usual, particularly over the Queenstown District. Among other damage due to Thunder and Hailstorms, the following may be mentioned:—On the night of the 8th a severe thunderstorm occurred over the southern borders of the Graaff-Reinet district, during which the Traffic Inspector's office at Klipplaat was removed a distance of 50 yards; on the same night a washaway occurred near Miller on the Oudtshoorn line; and a hailstorm, accompanied by what is described as a "cyclone," passed over Jansenville about 8 p.m., wrecking 22 houses, removing roofs of houses 200 to 500 yards, damaging about an equal number of other dwellings in the town, and one or two outside farms, and causing considerable damage to trees, gardens, etc., all in the space of about 10 minutes. This would appear to have been of the nature of a small tornado, somewhat similar to that at Malmesbury; fortunately no lives were lost although some persons were badly injured. A heavy thunderstorm occurred on the same date at Aliwal North. On the 24th a severe hailstorm smashed hundreds of panes of glass at Cypdorgat, and a farmer in the neighbourhood had all his large potato crop completely destroyed, as well as mealies and oats; while some sheep had their eyes knocked out, one being killed. On the 27th an unusually severe hailstorm passed over Mr. Fincham's farm at Imvani, the stones being reported to consist of jagged lumps of ice, the size of a breakfast cup; these pierced iron roofs and tanks, and even a thatched roof, severely lacerated the backs of the cattle, stripped the trees in the orchard of all fruit, leaves and branches, and destroyed the avenue leading to the house. On the 28th an extension of this storm seems to have passed over Queenstown from the South-West, affecting a wide area, extending from Essex station to the farm Thorny Vale, near Hangklip. Queenstown itself was only affected by a thunderstorm and heavy rain, the lightning striking a blue-gum tree in one of the streets. The hailstones were of considerable size, some measuring 3½ by 2½ inches, and one 4½ inches long by 4 inches in girth. This hail caused considerable damage to fruit and crops, as well as losses in small stock, one farmer having 15 sheep killed and 20 others injured, while in other cases the sheep had their legs broken; at Essex Railway station every pane of glass was broken. At Lady Frere and Aliwal North the large hail caused considerable damage to fruit and crops, as well as breaking a large number of panes of glass at the former place. As a result of these storms, our observer at Contest Farm (Bolotwa) reports that "the flood in the Kei River on the 28th was higher than in 1874. Old Kafirs have never seen the river so high. Water over top of arches of St. Mark's Bridge and six feet from parapet." The total rainfall for the month (7·84 ins.) there constituted a record since the starting of the station in 1885. In consequence of severe thunderstorms to the Northward on the same date, the river at Roodebloom came down in spate, considerably damaging the fences on the farm. On the 30th eight (8) donkeys were killed by hail near Aliwal North, as well as numerous sheep and goats. On the 31st during a thunderstorm affecting a wide area round Johannesburg the Boksburg lake overflowed and the chimney of the Transvaal Hotel at Krugersdorp was struck by lightning. No *Snow* or *Sleet* was reported.

Temperature, Cloud and Wind.—The mean temperature of the month of all stations was 68·4° or 1·3° lower than the average and 3 0° cooler than January, 1906. The monthly means were mostly about or slightly in excess of the average over the West and South-West, as well as at a few stations on the High Veld and in Kaffraria, the excess rising however to 2·6° at Weltevreden (Groot Drakenstein) and to about half that amount at Port St. John's, and Hopefountain in Rhodesia. Elsewhere the temperature was lower than usual by 1 to 2 degrees, the deficit, however, amounting to about 5 degrees in Basutoland. The mean maximum was 78·3° or 3·1° lower and the mean minimum, 58·5° or 0·5° higher than the corresponding averages, thus shewing a reduction of 3·6° in the mean daily range to (19·8°.) The mean maximum temperatures were mostly above the average in the West and South-West by 1 to 2 degrees, being also slightly in excess at Aliwal North and Hopefountain; along the South and South-East coasts, however there was a deficit of 1 to 2 degrees, as well as at most of the inland stations, increasing, however, to 3 to 4 degrees at a few stations in the east and south-east and as much as 6·9° at Leribe in Basutoland. The mean minimum temperature was mostly about 0 5° to 1 degree above the average in the West and South-West, also at most inland stations, the excess being greatest, 3·1° at Port St. John's and 2 7° at Hopefountain. At most of the stations actually on the coast, however, there was a deficit of 1 to 2·5 degrees but amounting to 4·7° at Leribe and Mohalie's Hoek in Basutoland. The mean warmest station was Kimberley (75·6°) and the coolest, Disa Head (Table Mountain) with a monthly temperature of 60·4°, a difference of 15·2°. The highest mean maximum was 89·2° at Kimberley, and the lowest mean minimum 52·4° at Disa Head. The highest readings of the thermometer occurred on eighteen days, chiefly the 31st, 3rd to 5th, 12th to 14th, and 20th to 26th; whilst the lowest readings at the various stations were recorded on nineteen different dates, principally the 16th and 18th. The mean of these absolute maxima was 91·6° or only 1·2° more than in December last, whereas the mean of the corresponding minima was 51·2° or 4·2° above the previous month, thus yielding a reduced mean monthly range of 40 4° Temperatures of over 100° F. were registered at six stations, the highest reading being 108° at Mount Ayliff on the 13th, whilst the lowest reading was two degrees below Freezing Point (*i.e.* 30° F.) at Mohalie's Hoek on the 5th —an extreme monthly range of 78°. *Frosts* were noted at Fort Fordyce on the 15th, 18th and 30th. The mean percentage of *Cloud* (50) was unusually high being 10 per cent. above the normal and 5 per cent. more than in January 1906. Generally speaking the mean cloudiness was considerably below the average in the South-West but in excess of the normal in the South and East, the interior and in Namaqualand, being greatest, 79 per cent. at Main and least, 18 per cent. at Weltevreden (Groot Drakenstein) many stations in the interior had a higher percentage of cloud than most of the coast stations. There was a marked increase over December in the number of *Fogs* reported, this phenomenon being noted at 185 stations on 28 days, principally the 6th, 10th, 14th and 17th. A most unusual feature was the occurrence this month of thick fog over Table Bay on the 16th and 22nd, on account of which the arrival of the English Mail was delayed for 13 hours on the latter date.

The prevailing winds were Southerly along the West Coast, Easterly at the Cape Agulhas, and Danger Point, Westerly from Cape St. Francis to Port St. John's and South-Westerly at Durban. Westerly winds also prevailed for some distance inland from the South-Coast but the prevalent direction was Northerly at Murraysburg, North-Westerly at Rietfontein. Over the inland portions of the South-East and Kaffraria, calms prevailed, the prevailing directions otherwise being East or North East and West or South West. The mean force of winds on the Beaufort Scale (0-12) was 1·84 corresponding to a mean velocity of 12·1 miles per hour or 1 7 miles per hour less than in December. At the Royal Observatory, there was a marked diminution in those winds from the Westerly half of the compass and a corresponding increase of Southerly winds, the mean force being slightly less than usual. The wind was reported as attaining the force of a *Gale* at 8 stations on 8 days; *Duststorms* occurred at 7 stations on 6 days, but there was an entire absence of *Hot Winds*.

OBSERVERS' NOTES.

VRUCHTBAAR.—End of month very dry, and scorching sun has played havoc with unirrigated vineyards and orchards.

KLIPFONTEIN (NAMAQUALAND).—Harvest very good.

THEEFONTEIN.—Prevailing winds North and North-west. No great heat; thermometer never going over 82° in the house. A few swarms of locusts passed over, but did no damage.

THE MEADOWS.—The veld is very short still, owing to locusts which are still about.

GRIQUATOWN.—Commonage overrun with voetgangers.

PELLA.—The grass which was growing very well has been almost destroyed by locusts.

VAN WYK'S VLEI.—Hartebeeste River in full flood; land under water.

FORT BEAUFORT.—Every appearance of a heavy mealie crop.

FORT FORDYCE.—Fever in sheep prevalent around here, also foot-rot, caused by excessive rains. Sheep dying in large numbers. Large stock doing well.

SUNNYSIDE (ALBANY.)—Mealies in good trim; every prospect of a very good crop.

BOLOTWA (CONTEST.)—The flood in the Kei River on the 28th was higher than in 1874. Old Kaffirs have never seen river so high. Water over top of arches of St. Mark's Bridge, and six feet from parapet. Record amount of rainfall for one month (7·84 inches) since 1885, when I started gauging.

CARNARVON FARM.—This January is the most distressing I have ever recorded—that is, taken all round and it demonstrates fully the climatic vagaries of South Africa. In January, 1904, we had 7·21 inches of rain, and from and including January, 1901, to January, 1907 (exclusive of January, 1905), we had a total of 9·42 inches, or the six years combined, only 2·21 inches more than 1904. We had over a foot of rain for the four months—September, October, November and December—and all late crops looked grand, but January with 1·97, all in miserable driblets, has done no end of harm to the potatoe and mealie crops, which have had a bad set back. Windy days only four—that is less than all previous Januaries. Cloudless days—nil; frosts—nil. Thirteen rainy days, made up of irritating tiny showers, that did little or no good. Locusts—large swarms daily, but so far have not done much damage; the large, white locust birds keep them on the wing.

LADY FRERE.—The hail on the 28th was very large. Did much damage to fruit and crops. Over 300 panes of glass broken in windows of houses in village. Heaviest hailstorm known in district.

THIBET PARK.—A grand season, best for a great many years. In some parts of district very severe hailstorms.

KOKSTAD.—Crops and gardens in splendid condition. All stock doing well. Rivers all full.

GROOT DRAKENSTEIN.—Maximum temperature of month 2·6° above average of eight years. The mean minimum being highest yet recorded for January. Rainfall 1·08 inches below average (1·36 in.) 14 years, or only 20 per cent.

KOKSTAD (THE WILLOWS.)—Monthly temperature slightly above December, but considerably lower than is usual in January. The rainfall is above the average. Thunderstorms have been numerous and severe, with some hail, but no damage has been noted. Rivers are full. Fruit is not plentiful, and what there is, is damaged by hail. One or two cases enteric in town.

JANSENVILLE.—Severe storm on the 8th, blowing away roofs of houses, trees, and damaging gardens.

TEMPERATURE, JANUARY, 1907.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory	78·1	60 6	69·4	98·2	31	52·5	16
Simon's Town	78·5	63·0	70·8	93·0	31	58·3	17
Table Mountain (Disa Head)	68·3	52·4	60·4	86·0	31	43·0	4
Sea Point	77·8	59·6	68·7	91·2	31	53·5	16
Wynberg	76·8	59·0	67·9	99·5	31	51·8	16
S. A. College	81·7	60·3	71·0	97·5	31	52·8	16
Elsenburg Ag. College	82·6	55·3	69 0	100·3	31	48·8	16
Groot Drakenstein	85·4	60·9	73·2	103·8	31	50·2	16
O'okiep	85·1	56·8	71·0	100·2	12	46·0	18
Port Nolloth	67·3	53 4	60·4	82·0	12	48·5	4
George Plantation	72·1	58·0	65·0	81·0	31	52·0	2
Cape L'Agulhas	72·1	62·3	67·2	76·0	29	54·0	15
Cape St. Francis	71·1	60·5	65·8	75·0	20	54·0	12
Port Elizabeth	73·9	62·2	68·0	80·0	22	57·0	11 & 19
Uitenhage	83·9	60·3	72·1	103·5	22	50·0	12
Van Staaden's River	75·2	59·3	67·2	97·0	23	51·0	12
Heidelberg	78·8	60·4	69·6	97·0	31	53·0	29
Mossel Bay	74·2	62·2	68·2	81·0	5	54·0	19
Potteberg	74·6	60·9	67·8	93·0	31	55·5	12
Storm's River	74·4	57·1	65·8	80·0	25	52·0	18 & 19
Amalienstein	87·6	59·6	73·6	102·0	21	53·0	20
Murraysburg	86·0	57·5	71·8	97·0	22 & 23	50·0	18
Kimberley	89·2	62·0	75·6	98·1	22	53·9	10
King William's Town	82·5	61·1	71·8	102·0	16	52·0	31
Bedford	79·5	56·3	67·9	97·0	14	48·0	16
East London	73·2	62·6	67·9	86·0	29	59·0	11
Sydney's Hope	73·9	53 6	63·8	95·0	22	50·5	18
Aliwal North	83·5	56·7	70·1	89·5	26	51·0	2
Rietfontein (Aliwal North)	80·1	55·2	67·6	86·4	25	50·2	2
Tabankulu	76·4	56·3	66·4	90·7	3	49·7	8
Kokstad	75·6	54·7	65·2	88·0	26	50·0	8 & 12
Umtata	78·8	60·7	69·8	98·0	13	56·0	8, 18 & 20
Main	76·8	57·8	67·3	92·0	3	52·0	18 & 31
Mount Ayliff	80·5	58·6	69·6	108·0	13	52·0	7
Port St. John's	78·8	66·2	72·5	85·0	4 & 14	60·0	18
Leribe	77·3	55·3	66·3	83 0	23	49·8	1
Teyateyaneng	79·2	53·2	66·2	85·0	5 & 24	49·0	2
Mohalie's Hoek	79·2	48·5	63·9	88·0	8	30·0	5
Kuruman	83·5	58·3	70·9	89·0	4 & 25	45·0	6
Hope Fountain	80·2	60·1	70·2	87·3	10	50·0	23
Means	78·3	58·5	68.4	91·6	..	51·2	..
Extremes	..	..	..	108·0	13	30·0	5

RAINFALL, JANUARY, 1907.

I. CAPE PENINSULA :

	INCHES
Royal Observatory (*a*) 12 inch gauge	0·57
Cape Town, Fire Station	0·37
Do. South African College	0 68
Do. Molteno Reservoir	1·09
Do. Platteklip	1·42
Do. Signal Hill	0·52
Do. Hospital	0·68
Sea Point (The Hall)	0·50
Do. (Attridge)	0·48
Camp's Bay	1·05
Table Mountain, Disa Head	1·49
Do. Kasteel Poort	1·89
Do. Waai Kopje	1·77
Do. St. Michael's	2·13
Woodstock (The Hall)	0·90
Do. (Municipal Quarry)	1·14
Do. (Do. Nipher's Shield)	1·45
Claremont (Carrigeen)	0·50
Kenilworth	0·38
Wynberg (St. Mary's)	0·68
Groot Constantia	1·05
Tokai Plantation	0·53
Plumstead (Culmwood)	0·51
Muizenberg (St. Res.)	1·36
Simon's Town (Wood)	1·51
Do. (Gaol)	1·40
Cape Point	0·45
Robben Island	0·38
Maitland Cemetery	0·49
Newlands Res. No. 1, 450	0·85
" " " 2, "	0·85

II. SOUTH WEST :

Eerste River	0·28
Klapmuts	0·31
Stellenbosch (Gaol)	0·19
Somerset West	0·15
Paarl	0·50
Wellington (Gaol)	0·68
Groot Drakenstein (Weltevreden)	0·28
Porterville Road	0·00
Tulbagh	0·16
Kluitjes Kraal	0·10
Ceres	0·18
Rawsonville	0·19
Worcester (Gaol)	0·10
Karnmelks River	0·38
Robertson (Gaol)	0·67
Do. (Govt. Plantation)	0·55
Danger Point	0·55
Vygebooms River	1·12
Elsenburg Agricultural College	0·30
Roskeen	1·15
Vruchtbaar	0·82

III. WEST COAST :

	INCHES
Port Nolloth (Lieut. Barber)	0·00
Anenous	0·18
Klipfontein	0·01
Kraaifontein	0·00
O'okiep	0 00
Springbokfontein	0·17
Concordia (Kraphol)	0·00
Van Rhyn's Dorp	0·28
Clanwilliam (Gaol)	0·07
Dassen Island	0·22
The Towers	0·34
Malmesbury	0·05
Piquetberg	0·00
Zoutpan	0·07
Wupperthal	0·00

IV. SOUTH COAST :

Cape Agulhas	0·62
Bredasdorp	1·36
Swellendam	4·25
Heidelberg	1·45
Riversdale	1·95
Vogel Vlei	0·71
Mossel Bay	0·75
Great Brak River	1·75
George	3·33
Do. (Plantation)	3·24
Woodifield (George)	0·79
Millwood	4·27
Sour Flats	2·37
Concordia	2·59
Knysna	1·22
Buffel's Nek	5·27
Plattenberg Bay	1·14
Harkerville	2·86
Blaauwkrantz	3·67
Lottering	1·92
Witte Els Bosch	2·64
Cape St Francis	0·43
Van Staaden's (Intake)	0·73
Do. (on Hill)	0 73
Uitenhage (Gaol)	0·82
Do. (Park)	0·76
Do. (Inggs)	0·77
Armadale (Blue Cliff)	1 82
Port Elizabeth (Harbour)	0·52
Do. (Walmer Heights)	1·64
Shark's River (Nursery)	0·42
Do. (Convict Station)	0·58
Potteberg	0·57
Edinburgh (Knysna)	2·34

V. SOUTHERN KAROO :

Ladismith	1·28
Amalienstein	0·74
Calitzdorp	0·50

V SOUTHERN KAROO—*Con.*

	INCHES
Oudtshoorn	0·00
Uniondale	0·75
Kleinpoort	1·19

VI. WEST CENTRAL KAROO:

Laingsburg	0·00
Fraserburg Road	1·19
Zwartberg Pass	2·10
Beaufort West (Gaol)	1 65
Nel's Poort	0·64
Krom River	0·83
Baaken's Rug	0·80
Willowmore	1·07
Rietfontein	3·56
Steytlerville	2·20

VII. EAST CENTRAL KAROO:

Buffels Kloof	1·96
Aberdeen (Gaol)	1·74
Corndale	1 92
Kendrew (Holmes)	1·67
Do.	1·80
Graaff-Reinet (Gaol)	1·10
Do. (Eng. Yard)	1·13
New Bethesda	2·14
Roodebloem	1·71
Glen Harry	3·70
Wellwood	2·47
Bloemhof	1·87
Jansenville	1·20
Patrysfontein	2·97
Bethesda Road	2·75
Klipfontein	1·20
Pearston	2·29
Darlington	1·31
Walsingham	2 43
Middlewater	2·18
Somerset East (Gaol)	3·65
Middleton	1·18
Spitzkop (Graaff-Reinet)	1·84
Bruintjes Hoogte	1·43

VIII. NORTHERN KAROO:

Calvinia	0·00
Middlepost	0·00
Sutherland	0·49
Fraserburg	0·86
Brakfontein	1·72
Victoria West	1·20
Britstown	1·45
Wildebeestkooij	2 91
Murraysburg	1·86
De Kruis (Murraysburg)	1·38
Richmond	1·70
Theefontein	2·97
Philipstown	3·80
Petrusville	1·64
The Willows (Middelburg)	1·39
Middelburg (Gaol)	1·47
Do	1·83
Jackalsfontein	1·17
Ezelpoort	1·13
Plaatberg	1·51
Grape Vale	0·93
Ezelfontein	1 73

VIII. N. KAROO:—*continued.*

	INCHES
Roodepoort	0·89
Groenkloof	0·83
Vlakfontein	1·19
Vogelsfontein	0 91
Plaatfontein	1·02
Colesberg	2·00
Fish River	3·30
Varkens Kop	2·25
Culmstock	2·60
Cradock (Gaol)	3·29
Witmoss	3 26
Maraisburg	1·87
Steynsburg (Gaol)	1·90
Hillmoor	2·66
Tarkastad	2 46
Do. (Dis. Engineer)	2·50
Waverley	3·27
Montagu	2·10
Schuilhoek	4·57
Vosburg	2·00
Zwavelfontein	1·56
Holle River	2·68
The Meadows (Schoombie)	2·08
Arundel (Colesberg)	3·24

IX. NORTHERN BORDER:

Pella	0 69
The Halt	3·18
Kenhardt	1·90
Upington	1·35
Trooilapspan	2·36
Van Wijk's Vlei	1·76
Prieska	2·83
Dunmurry	2·70
Griquatown	3 27
Douglas	3·52
Newlands (Barkly West)	3·08
Barkly West	4·93
Bellsbank	6·25
Kimberley (Gaol)	4·12
Do. Stephens	4·74
Strydenburg	1·89

X. SOUTH-EAST:

Melrose (Div. Bedford)	2·30
Dagga Boer	3·31
Lynedoch	4·41
Bedford (Gaol)	5·23
Do. (Hall)	4 52
Sydney's Hope	3 05
Adelaide	3 53
Atherstone	2·01
Salem	1·02
Fort Fordyce	5·20
Grahamstown (Gaol)	2·07
Heatherton Towers	0·76
Sunnyside	1·64
Fort Beaufort	3·70
Katberg	9 92
Seymour	4·04
Glencairn	5·12
Port Alfred	1·04
Hogsback	9·18
Peddie	0·41
Keiskamma Hoek	3·60

X. SOUTH-EAST—*continued*

	INCHES
Cathcart (Gaol)	3·49
Do. (Forman)	4·29
Thaba N'doda	5·35
Evelyn Volley	9·84
Crawley	4·91
Perie Forest	5·63
Forestbourne	5·82
Isidenge	4·85
Kologha	5·96
King William's Town (Dr. Egan)	2·39
Fort Cunynghame	7·18
Kubusie	3·76
Quacu	7·68
Kei Road	4·98
Bolo	4·37
Fort Jackson	2·55
Prospect Farm (Komgha	4·90
Komgha (Gaol)	5·59
Chiselhurst	3·06
East London West	2·58
Cata	6·73
Wolf Ridge	6·96
Dontsah	4·05
Mount Coke	1·90
Blackwoods	5·59
Albert Vale (near Bedford)	2·14
Heatherton Towers (Irrigation)	0·86

XI. NORTH-EAST:

Venterstad	2·16
Ellesmere	1·55
Molteno	4·90
Cyphergat	4·14
Thibet Park	5·42
Sterkstroom (Gaol)	1·67
Rocklands	3·27
Aliwal North (Gaol)	2·94
Do. (Dist. Engineer)	4·28
Carnarvon Farm	1·97
Halseton	3·15
Jamestown	3·34
Whittlesea	4·96
Queenstown (Gaol)	4·34
Rietfontein (Aliwal North)	5·16
Middlecourt	2·69
Dordrecht	4·51
Herschel	6·26
Lady Grey	6·01
Lauriston	5·24
Lady Frere	6·09
Contest (near Bolotwa)	7·84
Sterkspruit	4·58
Keilands	5·21
Barkly East	3·87
Rhodes	4·94
Albert Junction	2·86
Queenstown (District Engineer's Office)	5·10

XII. KAFFRARIA:

	INCHES
Ida (Xalanga)	6·12
Slaate (Xalanga)	7·07
Cofimvaba	5·49
Tsomo	5·50
Main	7·09
Engcobo	6·46
Butterworth	4·86
Woodcliff	10·42
Kentani	4·65
Maclear	8·92
Idutywa	2·13
Bazeya	9·91
Willowvale	3·91
Mount Fletcher	4·04
Elliotdale	4·47
M'qanduli	3·56
Umtata	3·29
Cwebe	3·48
Tabankulu	4·72
Mount Ayliff	3·50
Kokstad	4·82
Do. (The Willows)	5·75
Sceba	2·74
Flagstaff	7·94
Insikeni	7·73
Port St. John's	5·11
Umzimkulu	3·78
Mandileni	6·83
Wanstead	5·07
Maclear (Station)	8·60

XIII. BASUTOLAND:

Mafeteng	4·28
Mohalies Hoek	4·32
Maseru	7·71
Teyateyaneng (Berea)	5·95
Qacha's Nek	7·84
Leribe	9·77

XV. NATAL:

Durban (Observatory)	3·02

XVII. BECHUANALAND:

Taungs	5·84
Vryburg	5·78
Mafeking	3·17
Setlagoli	3·17
Kuruman	5·70

XVIII. RHODESIA:

Hopefountain	5·38
Rhodes Matopo Park	3·56

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 2nd March, 1907, ruling at the several centres named, is published for general information :—

CENTRE.	A. Wheat per 100 lb.	B. Wheat Flour per 100 lb.	C. Boer Meal per 100 lb.	D. Mealies per 100 lb.	E. Mealie Meal per 100 lbs.	F. Barley per 100 lb.	G. Oats per 100 lb.	H. Oat-hay per 100 lb.	J Potatoes per 100 lb.	K Tobacco (Boer Roll) per lb.	L. Beef per lb.	M. Mutton per lb.	N. Fresh Butter per lb.	O. Eggs per doz.	P. Cattle (Slaughter)	Q. Sheep (Slaughter)
	£ s d	£ s. d.	£ s d	£ s. d	£ s. d.	s. d.	s d.	£ s. d	£ s. d.	£ s d	s. d.	s. d.	£ s. d.	s. d.		
Aliwal North ...	0 8 0	0 15 0	0 13 0	0 8 6	0 4 6	7 6	8 0	0 4 6	0 4 6	1/- to 2/-	8d to 9d	6d to 8d	0 0 8	1 6	£9 to £10	21/- to 24/-
Beaufort West ...	0 11 0	0 16 0	0 12 6	0 4 6	0 12 6	10 0	9 6	0 5 6	0 6 0	0 0 10	*6d to 1s	*6d to 7d	0 1 6	1 9	£15	23/6
Burghersdorp .	...	...	...	...	...	...	...	...	0 2 6	...	*0 5	*0 6	0 0 10	1 4	...	...
Cape Town ...	...	...	...	...	...	7 6	6 6	0 4 0	0 4 0	...	...	...	0 1 3	1 9	...	...
Clanwilliam ..	0 11 3	...	0 12 6	...	...	10 0	8/6 to 11/6	...	0 8 6	0 1 0	7d. to 8d	6d to 8d	0 1 6	9d to 1/-	...	...
Colesberg ..	0 9 3	...	...	...	...	...	...	5/6 to 6/6	0 6 0	...	...	0 4	0 0 6	1 5	...	...
Cradock ..	0 7 0	...	...	...	...	6 0	7 0	0 4 0	0 3 3	0 0 6	...		0 1 0	2 0	...	...
Dordrecht ..	0 7 0	0 13 0	0 10 3	0 7 0	0 9 0	4 0	5 0	0 2 0	0 2 0	0 1 0	0 8	0 6	0 0 9	1 3	£10	18/-
East London ...	0 11 0	0 11 3	0 11 0	0 6 6	0 10 0	5 0	9 0	0 4 6	0 5 0	0 1 6	*8d & †7d	0 6	0 1 0	2 7	£22	37/6
Graaff-Reinet ..	0 9 0	...	0 9 0	0 7 0	...	5 0	...	0 3 6	0 3 0	...	0 5	*8d & †7d	0 1 6	1 6	£10	15/-
Graham's Town	0 7 9	...	...	0 7 9	...	4 0	6 6	0 5 0	0 4 0	0 0 7	0 6½	0 5	0 1 8½	2 2	...	...
Kimberley ..	0 10 0	0 14 6	0 13 0	0 6 6	0 8 0	7 6	8 6	0 6 3	0 12 0	0 0 7½	0 10	0 7	0 0 11	2 3	£10 to £12	18/- to 20/-
King Wm's Town	0 7 0	0 14 0	0 11 6	0 5 6	0 7 0	5 0	6 0	0 3 0	0 3 6	0 0 4	0 6½	0 8	0 1 0	1 9	£14 5s.	£1 1s.
Malmesbury ..	0 8 0	0 14 0	0 10 0	0 7 6	...	7 6	6 0	0 3 6	0 8 6	0 1 0	0 7	0 6½	0 1 4	1 6	£10	20/-
Mossel Bay ..	...	...	0 13 0	0 18 0	...	...	...	...	0 13 0	...	...	0 6	0 1 6	1 0	...	...
Port Alfred ..	0 10 0	0 16 0	0 14 0	0 7 6	0 12 6	5 0	6 0	0 3 0	0 4 6	0 1 0	0 7	...	0 2 6	2 0	...	...
Port Elizabeth ...	0 7 6	...	...	0 7 6	...	4 0	6 0	0 3 3	0 9 0	0 0 4	0 7	0 7	0 1 2	2 4	...	...
Queen's Town ..	0 5 6	0 9 6	0 5 0	0 4 9	0 5 0	5 0	6 3	0 2 6	0 3 0	0 1 0	*0 6	0 7	0 0 9	1 6	£12 to £15	20/- to 25/-
Tarkastad ..	0 11 6	0 13 6	0 12 6	0 8 0	0 9 6	5 6	10 0	0 5 0	0 5 0	0 1 0	*0 6	*0 7	0 0 6	1 4	£10	20/-
Vryburg ..	...	...	...	0 8 6	...	...	...	0 7 0	0 6 0	...	...	*0 6	...	...	...	...
Worcester ...	0 8 6	0 13 6	0 10 0	0 8 0	0 9 0	7 0	6 3	0 3 9	0 4 0	0 0 6	*6d to 9d †5d to 8d	... *7d & †6d	0 1 6	1 8	£9 to £12	22/- to 25/-

NOTE.—A blank space denotes "no transactions' *Colonial. †Imported

DEPARTMENTAL NOTICES.

APPLICATIONS FOR AGRICULTURAL EMPLOYMENT.

Louis A. Lauder, 2, Rowlands Cottages, Klipper Road, Newlands, Cape.—Employment wanted in dairying or general farm work. Understands treatment of cattle and horses, also of livestock generally, together with land cultivation. References good. Age 41. Married; two children.

J. G D. Rex, Barroe Station, Steytlerville:—Age 59. Married. One child Twenty years experience in Sheep and Goat farming. Understands livestock generally. Desires management of Farm or Dairy, or other farm work. Wife understands management of poultry.

Wanted position on a good stock farm as assistant or under-manager; applicant has had year-and-a-half's experience on Eastern Province stock farm, would be satisfied with board and small salary, or grazing for stock. Satisfactory testimonials, age 26, unmarried.—Reply to C. D. P.O. Box 61, Grahamstown.

Charles J. Veitch, Goudfontein, P.O. Roodehoogte, Middelburg: Young apprentice wanted for general farm work. Mixed farming, agricultural and live stock, but principally small stock. References as to respectability are requisite, as apprentice will live with family. Must be prepared to work. No salary first few months, after that by mutual arrangement.

E. J. G., of Balfour, has a knowledge of tobacco culture, and would like employment on a farm where that crop has never been tried. Would be pleased to learn something of stock. Good references.

"Manager," care of Mr. Attorney Trollip, Capetown, seeks employment as estate or fruit farm Manager. Is thoroughly conversant with fruit tree and vine culture, the grading and packing of fruit for market, the planning, planting and general management of estate. Highest references.

Lady, trained at the Dairy College, Kilmarnock, and holding the National Dairy Diploma, seeks employment. Understands shorthand and typewriting. Has had business experience and is very capable. Would accept work as accountant or secretary at a dairy, but prefers dairying. Good references. Apply the Secretary, South African Colonisation Society, Munsted Rough, Godalming, Surrey, England.

Young Englishman, married (aged 29), well educated, with six years' residence in South Africa, seeks employment as farm-bailiff, working manager, or assistant on a farm, with a view to gaining experience of South African farming (stock preferred). Wife musical, and qualified and willing to teach young children. Agreement if desired. Remuneration small. Highest references. Address: Lawson, "Rockstead,' Bellwood Estate, Sea Point, Capetown.

F. W. Kock, Jandelangesfontein, Richmond: Young Apprentice wanted for general farm work. Mixed farming, agricultural and live stock, but principally small stock. References as to respectability are requisite, as apprentice will live with family. Applicant to state salary.

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town. Members of Farmers' and Fruit Growers' Associations applying for same through the Secretaries of these Associations are supplied free of charge.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V of *Agricultural Journal*.

Artificial Grasses and Fodder for Stock; Ensilage; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry; Locusts and their Destruction; Possible New Industries for Cape Farmers; Stock Farming; Dairying; Fruit Culture (6d.)

Agriculture.

Wheat Production in Australia (1s. 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s. 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A. W. Heywood; *Brak Land in Relation to Irrigation and Drainage (1d.); The Velvet Bean (1d.); Potato Disease (1d.); Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d.); Sundry Forage Crops for trial in Cape Colony (1d.); Poultry in South Africa: Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.); Tobacco Culture by P. Bornemisza (1d.); The Cultivation of Tobacco in the Colony by K. Schenck (3d.); Tobacco Wilt in Kat River Valley (1d.); *The Process and Appliances for the Flue Curing of Tobacco. (3d.)

Dairying.

Dairy Breeds by A. C. Macdonald (9d.); *Dairy Industry in Great Britain by A. C. Macdonald (6d.); *Dairy Industry in Denmark (2d.); Ready Reckoner for Cream Testing (1s.); †Dairy and its products by D. Hutcheon (2d.); *Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.); Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d.); *Codling Moth (1d.); Fruit Fly (1d.); Fumigation Supplies (1d.); Insect Friends and Foes (1d.); Methods of Locust Destruction (1d.); *Peach Yellows (1d.); Pear Slug, Paris Green (1d.); Remedy for Mestwurmen (1d.) *Spray Calendar (1d.); *Spray Pump Notes (1d.); Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d.); Tree Fumigation in California (1d.); Winter Spraying (1d.); Wattle Bag Worm (1d.); Bordeaux Mixture (1d.); Deaths Head Moth Superstition (1d.); Fumigation under Box Covers (1d.); The House Fly (1d.); New Oak Tree Pest (1d.): Nursery Inspection and Quarantine Bill (1d.); Oil Water Pumps (1d.); The Plague of Ticks (1d); Potato Tuber Moth (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d.); Gall Worms in the Roots of Plants (1d.); The Fruit Fly,* (with coloured plates) (3d.); Another Introduced Scale Pest (1d.); Washes for Red Scale (1d.); Fruit Fly: Peach Fly (1d.); Lime-Sulphur-Salt Wash for Scale Insect (1d.); The Fruit Moth (1d.); Fusicladium of the Apple and Pear (1d.); Mealie Stalk Borer (3d.)—*coloured plate*· Cleaning up Nursery (1d.); Natural Enemies of the Fruit Fly: Report on Investigations in Brazil (1d.); Locust Birds and Locust Poison (1d.); The Brazil Fruit Fly Parasites (1d.); Cyanide Gas Remedy for Scale Insects (3d.); Arsenate of Lead (1d.)

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d.); †Elementary Principles of Sylviculture or Woodcraft (1d). National Forests (1d.); Indigenous Timbers of the Cape (1d.); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.); Tree Planting for Farmers (1d.)

Note.—All those marked with * are obtainable in Dutch and English.

† Dutch only.

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d.); Portable Floating Hatching Box for Trout Ova (1d.) The Protection of Trout (1d.); The Ocean and its Resources (1d.)

Horticulture

Fruit Culture in the Gamtoos River Valley (1d.); *Marketing of Fruit (1d.); Manual of Practical Orchard Work at the Cape (6d.); The Olive at the Cape (2d); Tomatoes and Fruit for Export (1d.); Citrus Culture in Cape Colony: Report of the Citrus Commission (1d.); *Fruit from Orchard to Buyer (1d); Netting for Fruit Trees (1d.); Fruit Culture in Argentina (1d.); Vegetables for Exhibition (1d.) Chrysanthemum Rust (1d.)

Veterinary and Animal Industry,

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d.); * Heartwater (1d.); *Malarial Catarrhal Fever of Sheep (1d.); * Preventive Vaccination against Anthrax and Swine Fever (1d.); Rinderpest: Dr. Koch's Report (1d.); *Inoculation against Rinderpest (1d.); Dr. Kohlstocks Report on Inoculation for Rinderpest (1d.); * Redwater, Texas Fever or Tick Disease (1d.); * Redwater, Anthrax and Quarter Evil (1d.); *Sheep and Wool (1d.); The Eye and its Diseases (1d.): Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.); Tick Heartwater Experiments (1d.); Indigestion and Diarrhœa in Calves (1d.); Persian Sheep and Heartwater (1d.); Poisoning of Stock (1d.); Retention of the Fœtal Membrane, or Afterbirth in Cows (1d.); Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d.); Tuberculosis and the Use of Tuberculin (1d.); African Coast Fever with Description of Dipping Tank (3d.); *Rinderpest in South Africa (3d) by D. Hutcheon; *Fluke or Slak in Liver of Sheep (3d.)—*coloured plate*; *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.); Osteo Porosis (3d.)—*coloured plates*; *Glanders (3d.)—*coloured plate*; *Animal Castration (1d.); *Preventive Inoculation for Redwater (1d.); * Abortion in Cattle (1d.); Treatment for Worms in Domestic Animals (1d.); *Lungsickness of Cattle, Contagious Pleuro-Pneumonia, or Pleuro-Pneumonia-Bovum-Contagiosa (1d.); *Swine Fever, Hog Cholera or Pig Typhoid (3d.)—*coloured plates*; Castration of Females and Animals other than the Horse (1d.); Poisoning of Horses by *Ornithogalum Thyrsoides* or Chinkerinchee (*coloured plate*) (3d.); Diseases of the Horse and their Treatment (1s.); Horse Sickness by D. Hutcheon (2d.); Ticks and African Coast Fever (1d.); Cirrhosis of the Liver in Stock (1d.); Liver Disease among Calves (3d.); The Arsenite of Soda Dipping Mixture (1d.); *Lampas.

Viticulture.

†Reports on Viticulture (3d.); *Reconstitution of Phylloxerised Vineyards (1s.); Report on Failure of Hanepoot Grapes on American Vines (1d.); The Making of Wine and its By-Products (6d.); How to Treat Wine Casks (1d.); Failure of Vines (1d.); Manufacture of Dry Wines in Hot Countries (3d.)

Miscellaneous.

Game Seasons (3d.); Land Laws of Cape Colony (1d.): †Monsonia: the Cape Cure for Dysentery (1d.); *Rainfall of South Africa (1d.); Sand Dunes of Gascony (5d.); The Metric System (1d.); South African Stud Book, Constitution, Rules, &c. (1d.); Bars in Ostrich Feathers (1d.); *Information regarding the Mining Laws. (1/-.)

NOTE.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

THE PRODUCE MARKET.

CAPE TOWN.

Mr. R. Muller, of Strand Street, Cape Town, reports for the month ending February 28th:—

Ostrich Feathers.—The market has been fully supplied. The offerings consisted of some very good pluckings. Buyers for export find it somewhat difficult to meet sellers' ideas, and I would advise my clients not to put too high a value upon their goods. Good quality is wanted, but buyers will not make further concessions than the trade at Home warrants.

	£	s.	d.	£	s.	d.
Super Primes	11	0	0	35	0	0
Firsts, Ordinary to Super	8	10	0	12	10	0
Seconds	6	10	0	8	10	0
Thirds	3	10	0	5	10	0
Femina, Super	9	10	0	14	0	0
Femina, Seconds to Firsts	4	10	0	8	10	0
Byocks (fancy)	5	10	0	8	10	0
Long Blacks	3	10	0	7	10	0
Medium Blacks	2	0	0	3	0	0
Short to Medium ..	0	10	0	2	10	0

	£	s.	d.	£	s.	d.
Floss	0	5	0	1	10	0
Long Drabs	2	10	0	4	0	0
Medium Drabs	1	5	0	2	0	0
Short to Medium ..	0	10	0	1	15	0
Floss	0	2	6	1	10	0
White Tails	1	15	0	3	10	0
Coloured Tails	0	10	0	2	10	0
Chicks	0	1	0	0	2	0
Spadonas	2	10	0	4	10	0
Inferior Black and Drabs, short to long	0	0	6	1	10	0

Wool.—The market is steady, with a continued inquiry for all well grown wools of combing description. Long, Light Karoo clips have been sold at from 7¾d. to 8¼d., according to quality and condition. There is a good demand for Light Lambs' Wool, which has realised up to 9d. for Grass Veld, and up to 8d. for Karoo.

Snow-whites are in good request. Extra Super parcels may be quoted up to 1s. 9½d.; Medium from 1s. 5½d. to 1s. 7d.; Ordinary and Seconds from 1s. 2d. to 1s. 4½d.

	s.	d.	s.	d.
Super long Grass Veld	0	8	0	10
Do. Karoo	0	6¾	0	8
Medium	0	5	0	6
Short and Inferior ..	0	4	0	4½
Wool for washing	0	4½	0	6

	s.	d.	s.	d.
Snow-white, Super to Extra	1	7	1	9½
Do. Ordinary	1	1	1	6½
Fleece, washed	0	0	0	10

Mohair.—Business has been confined mostly to Firsts and Winter parcels. Prices generally are unchanged. In Kids little business has been done.

	s.	d.	s.	d.
Firsts, Summer	1	1½	1	2½
Kids	1	4	1	7
Seconds	0	6½	0	10

	s.	d.	s.	d.
Winter	0	10½	0	11½
Do. Kids	1	1	1	2½

Hides and Skins.—There is a continued good demand for all classes. The only quotable change is in Cape skins, which are selling 2d. each below my last quotation.

R. MÜLLER, 77, STRAND STREET, CAPE TOWN,

Pays HIGHEST prices for:—

WOOL, OSTRICH FEATHERS,
MOHAIR, SKINS, HIDES,
and other **PRODUCE.**

R. MÜLLER, Cape Town,

Supplies **Best MERINO RAMS** and **EWES.**

Bankers: African Banking Corporation.

P.O. Box No. 133 Telegrams: RELLUM, Cape Town. Telephone No. 180.

R. MÜLLER,

77, Strand Street, CAPE TOWN.

Wall Papers! Paints!

The most artistic selection in South Africa to select from. Wall Papers, Lincrusta Walton, Anaglypta, Papier Mache Cornices, Centres, etc.

White Lead, Paints, Oils, Varnishes, etc.

All goods warranted best quality. Lowest market prices.

Sole Agents for DURESCO the famous Washable Distemper, better than Oil Paint on new plaster, and specially suitable for Farm Buildings. Will stand storm or sunshine.

Samples and Price Lists on Application.

SMYTH & CRAWFORD,

35, Wale Street, CAPE TOWN.

One Door above Loop Street.

PORT ELIZABETH.

Messrs. John Daverin & Co. report under date February 28th, 1907:—

Ostrich Feathers.—The market was well supplied this week with a good average assortment. Competition was fairly active, and last week's prices fully maintained. Only a limited amount of business has been done out of hand at unchanged prices.

	£	s.	d.	£	s.	d.
Primes: Extra super	Special Prices.					
Good to Super..	12	0	0	16	0	0
Whites: Firsts	9	0	0	12	0	0
Seconds	6	0	0	9	10	0
Thirds	3	0	0	5	10	0
Feminas:						
Super	9	0	0	14	0	0
Firsts	6	10	0	9	10	0
Seconds	5	0	0	6	10	0
Thirds	2	10	0	3	0	0
Greys	4	10	0	7	0	0
Fancy	5	10	0	8	10	0
Tails: White	1	10	0	3	10	0
Light	1	5	0	2	10	0
Coloured & Dark	0	5	0	1	2	6

	£	s.	d.	£	s.	d.
Blacks: Long	3	0	0	5	0	0
Medium	1	5	0	2	10	0
Short	0	10	0	1	0	0
Wirey	0	1	0	0	1	0
Floss	0	6	0	1	7	6
Drabs: Long	1	10	0	3	5	0
Medium	0	12	6	1	0	0
Short	0	2	6	0	6	0
Wirey	0	0	6	0	1	0
Floss	0	6	0	1	7	6
Spadonas: Light ..	1	5	0	4	10	0
Dark	0	10	0	1	15	0
Chicks..	0	0	3	0	1	6

Wool.—This market continues firm, and a good business has been done in the open market during the week at full current prices, our sales of 1,450 bales being the most important, and for which we got satisfactory prices. Amongst the clips we sold were two from the flocks of Messrs. F. & J. Naude, McCabe's Spruit, Modderpoort, and for which we obtained the extreme price of 8d.; also the clips of Mr. N. Vermaak, Damplaats, and Mr. Jan Maree, Brandfort. The get-up and condition of these four clips were all that could be desired.

	d.	d.
Snow-white, Extra Superior	19½	21
Do. Superior..	18	19½
Do. Good to Superior..	16½	17½
Do. Inferior Faulty ..	16	16½
Grease, Super long, well-conditioned, Grassveld grown (special clips).	9½	10
Grease, Super Long, well-conditioned, Grassveld grown..	8	9
Grease, Super Long, well-conditioned, Karoo grown (special clips)	7½	8
Grease, Super Long, well-conditioned, Karoo grown..	6½	7
Grease, Super Long, well-conditioned, Mixed Veld	5¾	7
Grease, Light, faultless, medium, Grasveld grown	6½	7¾
Grease, Light, faultless, medium, Karoo grown	6	6¼
Grease, Light, faultless, short, Karoo grown ..	5½	5¾

	d.	d.
Grease, Short, faulty and wasty	5	5¼
Grease, Coarse and Coloured	4¼	4¼
Scoured, Coarse and Coloured	6½	12
Basuto Grease, short.. ..	6¼	6⅜
O. R. C. Grassveld Grease, long and well-conditioned (special clips)	7½	8
O. R. C. Grassveld Grease, long and well-conditioned	6½	7¼
O.R.C. medium grown, light, with little fault	6	6½
O.R.C. short, faulty and wasty	5	5¼
O.R.C. Karoo grown, long and well-conditioned	6¼	6¾
O.R.C. medium grown, light, with little fault	5	6
O.R.C. short, faulty and wasty	4½	5

Mohair.—There is a decidedly better tone in this market, especially for O.R.C. parcels, and several sales have been made at current prices; the most important sale made was by ourselves of 80 bales Basuto's at 11½d. We also sold 41 bales Summer Kids at 18d. So far there is no demand for Summer Firsts. On the public market on Tuesday a fair quantity was offered, prices shewing little or no change.

	d.	d.		d.	d.
Super Kids	18	18	Mixed O.R.C. Hair, very mixed	10	10½
Ordinary Kids	16	17	Seconds and Grey	8	9
Superior Firsts (special clips),	14½	14½	Thirds	6¾	6¾
Ordinary Firsts	14	14	Winter Kids (special clips)		14½
Short Firsts	13	13½	Winter Kids (good ordinary)	13	14
Superfine Long Blue, O.R.C. Hair	14	14½	Winter Hair	11	11½
Mixed O.R.C. Hair (average)	11	11½			

Skins.—Sheepskins sold this week in bundles, at 7¼d. per lb.; Pelts, 6¼d.; Capes, 2s. 3d. each; damaged, 9d. each; Goat, 14¼d.; damaged, 6½d. per lb.; Angoras, 9¼d.; Shorn, 6½d.; damaged, 4½d. per lb.

Hides.—Sundried sold at 9¼d., damaged 6¼d. per lb.; Drysalted 8d., damaged 5½d. per lb.; Madagascar hides 7d., damaged 5½d. per lb., Thirds 3½d. per lb.

BREEDERS' DIRECTORY

AND GENERAL FARM NOTICES.

Notices under this heading are inserted at the rate of one penny per word per issue; minimum charge 2s. 6d. Payment must accompany order. Six consecutive insertions 10% discount; twelve 15% discount. Cheques and P.O.O. to be made payable to the Accounting Officer, Department of Agriculture, Cape Town.

CATTLE.

HEREFORDS.

Young bulls for sale, sired by "Chain Armour" ("Armour Plate," 19838,—"Patience"). First prize winner Port Elizabeth and East London Shows, 1905-1906. Mr. B. Webb, Arundel Stud Farm.

JERSEYS.

Thoroughbred Herd. Celebrated Island bred bull "Clove," and several of the best cows and heifers from Mr. H. W. Struben's late herd.—Mrs. A. A. Dunn, De Tuin, Piquetberg.

Thoroughbred Herd. Young Bulls for Sale from "Bondsman" out of "Little Billy" cow. Both bulls came from Mr. Adriaan van der Byl's celebrated Jerseys at Roodebloem, Cape Town.—P. V. Carlisle, Bridge, Albany.

Thoroughbred pedigree bulls for sale, from Imported or Colonial bred prize stock, good milking strain. For particulars, apply to Superintendent, Porter Reformatory, Tokai, P.O. Retreat.

FRIESLANDS.

Pure Frieslands. Enquire for cows, young bulls, and heifers. Oldest pure herd in Eastern Province. Grand milkers. Prize stock. Also, Colonial Rambouillet Flock Rams, limited number.—F. F. Wienand, Bellevue, Bedford, C.C.

DEVONS.

Varkens Kop Herd of Pedigree Devons, quality, size, rich milk, very hardy, many prize winners. Cows, Heifers and young Bulls for sale. Ostriches, bred from best strains in South Africa; pairs for sale. Horses, "Typical South African Breed," untrained colts for sale. W. R. Southey, Varkens Kop, Schoombie, C.C.

SHEEP.

MERINOES.

Rambouillet Rams, from Colonial Ewes by Imported and Colonial sires. Sold at all Bedford Ram Fairs. Partridge Wyandottes and Indian Runner Ducks' Eggs.—Pringle Bros., Glen Thorn, P.O. Linton, Adelaide.

R. Pell Edmonds, Ripplemead, Dohne, Breeder of Pure-bred Pedigree Merino Sheep and Pedigree Black Welsh Cattle. —For particulars, see page xxxviii.

PIGS.

Arthur Jones, Green Bushes, Port Elizabeth Breeder of Berkshire and Large White Yorkshire Pigs from Imported Pedigree strains; Winners of 14 First, 6 Second Prizes and 1 H. C. at Grahamstown and Port Elizabeth Shows of 1905 and 1906.

Bershire pigs, thorough bred, pedigree, boars and sows, from Imported stock, winners of numerous prizes. For particulars, apply to, Superintendent, Porter Reformatory, Tokai, P.O. Retreat.

OSTRICHES.

Specials only.—Chicks, £5 to £20 each; Young Birds, £10 to £30.—F. W. Baker, Laughing Waters, Willowmore.

GENERAL.

H. Vermaak, The Pines, Maraisburg, Cape Colony, has on hand and for sale at very reasonable prices, PURE-BRED FRIESLAND BULLS and PURE-BRED MERINO RAMS of the RAMBOUILLET breed.

THOROUGHBRED PERSIAN RAMS and OSTRICHES.—Hougham Abrahamson Long Hope Siding, C.C. Breeder of Rams from progeny of ewes passed into Stud Book. of Cape Breeders' Association. Also selected Breeding Ostriches.

PASPALUM GRASS PLANTS.—Quotations for plants, in bags free on rail Stellenbosch (keep moist long distance). See *Agricultural Journal*, May, 1906, page 622, or from A. C. Bulles, Dwarsriviershoek, Stellenbosch.

General—*continued.*

PURE BRED ANGORA GOAT RAMS.

Bred from the Choicest Strains, and Prize-winners at the leading Agricultural Shows of Cape Colony. For particulars apply to A. B. Hobson, Martyrsford, Jansenville.

PERSIAN SHEEP AND OSTRICHES

S. Montague Gadd, Springfield, Tafelberg. Orders booked for young rams, from Stud-book Ewes and for Ostrich Chicks from the best strains in the country.

THE POULTRY YARD.

PRIZE and UTILITY POULTRY of the BEST ENGLISH and AMERICAN STRAINS.—SOUTH AFRICAN BRED. —Hardy, Healthy, Vigorous, Egg Production a Speciality. WHITE LEGHORNS—BROWN LEGHORNS —BUFF LEGHORNS — WHITE WYANDOTTES — SILVER PENCILLED WYANDOTTES—BARRED PLYMOUTH ROCKS. Stock & Eggs for Sale in Season.—Correspondence invited.—S. Smith, Talana, Wellington Avenue, Wynberg.

Geo. E. Barrett, P.O. Box 964, Cape Town. Importer of Poultry, Pigeons, Cage Birds and Appliances of every description, from Wicks Bos., Norwich. Trial solicited and Catalogues forwarded on application.

Ulyate Orpington Poultry Farm, Berlin, Cape Colony. Eggs from pure Black, White, Buff Orpingtons, Minorcas, Leghorns. Cock, Hen, and Poultry Remedies *for sale.* For further particulars write *now* for catalogue. Winners of hundreds of prizes.

BUFF ORPINGTONS.

THE FARMER'S FOWL. The fowl that LAYS WHEN EGGS ARE TOP PRICE and are also A 1 table birds. My Buffs have unlimited orchard and grass run, and are noted for hardiness and good laying qualities. Young stock always for sale at very reasonable prices. Ask for inclusive quotations; carriage paid to any station in South Africa and AT MY RISK to rail destination. My list of prizes won at shows all over South Africa will convince you that this unrivalled *Colonial* strain of 9 years' standing CAN HOLD ITS OWN AGAINST IMPORTED STOCK. Buy hardy Colonial-bred birds and save your pocket. Eggs from pure-bred utility strain, 12/6. Address: A. C. Buller, Dwarsriviershoek, Stellenbosch.

TURKEYS.

MAMMOTH AMERICAN BRONZE.—HARDY STRAIN OF GREAT SIZE. Noted prize winners. Young stock for sale after April. Orders booked now. Ask for inclusive quotations. Carriage paid to any station in South Africa and AT MY RISK to rail destination. Eggs in season. Full particulars from A. C. Buller, Dwarsriviershoek, Stellenbosch.

THE

Agricultural Journal

OF THE CAPE OF GOOD HOPE.

No. 4. APRIL, 1907. VOL. XXX.

Published Monthly in English and Dutch by the Department of Agriculture and distributed gratis to bona fide farmers in the Cape Colony on application through the Resident Magistrate of the District.

Advertising.—Approved Advertisements are inserted. Full particulars can be obtained of Messrs. Hart & Co., the Advertising Agents, Parker's Buildings, Cape Town (P.O. Box 898), to whom all communications *re* advertising should be addressed. Telegrams: "Advertise," Cape Town.

Postal Address:

The Editor "Agricultural Journal," Department of Agriculture, Capetown

Telegraphic Address: "Bulletin," Capetown.

CONTENTS.

PAGE.

NOTES— 422—428

To Correspondents.—The Agricultural Shows.—Correction.—Rebate on Oil used as Fuel for Irrigation Purposes.—Wine Shows, 907.—"C.O.D." Collection Delivery.—Cape Wine in London.—Horse Sickness.—South African Meat in London.

FARM AND VELD— 429—436

Glycerining Prunes.—Lucerne Side-delivery Rakes—Economical Wagon Wheels.—The Nicholson Sulphuring Chamber for Dried Fruit.—Devonshire Cream and Cream Cheese-making.

A TREATISE ON CITRUS CULTURE FROM SEED TO FRUIT. By W. E. Masters ... 437—453

THE FERTILITY OF SOME COLONIAL SOILS, AS INFLUENCED BY GEOLOGICAL CONDITIONS. By Chas. F. Juritz .. .. 454—476

THE IRRIGATION ACT, No. 32 OF 1906 ... ... 477—495

RETURN OF FRUIT SHIPPED FROM CAPE COLONY TO ENGLAND DURING FEBRUARY, 1907 495

THE ROTATION AND MANURING OF CROPS. Prize Essay. By G. M. Godlonton ... 496—502

AGRICULTURAL SHOW DATES, 1907 502

WHEAT IN CAPE COLONY. By Dr. Eric A. Nobbs ... ... 503—521

RURAL CAPE COLONY, No. XXV. By F. D. MacDermott 5 2 531

SUNSTROKE, OR "DOMZIEKTE" IN SHEEP . ... 531—533

THE FARMERS' CONGRESS ... ... 534—544

A CASE OF TRAUMATIC PNEUMONIA 545

FARMERS' WOOL PRESSES ... ... 546—548

E. P. HORTICULTURAL BOARD ... ... 549—555

DEHORNING OF CALVES 554

WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION ... ... 555—556

CORRESPONDENCE 557—567

Farmers and Agricultural Shows.—Molteno Drift Sands.—Water Drills and Water Boring.—Foot Rot or "Klauwziekte" in Sheep.—Lamziekte at Knysna.—Rainfall Records.—Utility of "Homers" in the Country Districts.—Manuring of Citrus Trees and *Mal di Gomma*.—Yellow Liver in Ostrich Chicks.—Linseed Oil: Boiled and Raw.—Arsenical Dip for Goat Scab.—Horse Sickness.

RURAL REPORTS ... ... 568—570

NOTES ON THE WEATHER OF FEBUARY, 1907 ... . 571—575

RAINFALL RETURNS, FEBRUARY, 1907... ... ... 576—578

CURRENT MARKET RATES 579

DEPARTMENTAL PUBLICATIONS ... ... 580—581

THE PRODUCE MARKET ... ... 583—585

BREEDERS' DIRECTORY ... ... 587—588

INDEX TO ADVERTISERS ... ...lxiii—lxiv

Q

NOTES.

To Correspondents.

A letter was received by the Department dated Orange Grove, January 17th, but unsigned, and giving no postal address. It asked for information *re* Prickly Pear Soap. The information is available if the correspondent will take the trouble to forward his name and address.

The Agricultural Shows.

Owing to pressure on our space, reference to the Agricultural Shows held since the last issue is unavoidably held over. Other subjects of interest are also crowded out, for which we crave the indulgence of contributors.

Correction.

In the last issue of the *Agricultural Journal* a mistake occurred in the answer to a query in the correspondence pages. On page 393, a prescription is given for a horse out of condition to contain eight drachms of powdered sulphate of iron. This should have been two drachms.

Rebate on Oil used as Fuel for Irrigation Purposes.

All landowners and irrigators using oil engines for the raising of water applied to purposes which legitimately constitute irrigation of land for farming purposes in the Cape Colony, and desirous of securing a rebate, should communicate with the Civil Commissioners of their respective divisions and furnish particulars: 1, Fiscal division; 2, name of owner; 3, name of farm; 4, description of plant; 5, area proposed to be irrigated; 6, existing area under cultivation (if any); 7, additional area (if any) to be brought under irrigation by the pumping plant in respect to which application is made; 8, classes of crops to be irrigated.

Wine Shows 1907.

The Western Province Board of Horticulture has fixed upon Wednesday, October 23rd, as the date for the annual Wine Show, which is to be held in the offices of the Western Province Agricultural Society, Parker's Buildings, Cape Town. The prize list is as under:—

SECTION A.—WHITE WINES.

Class 1.—Best ten leaguers wine of a Hock type (light white wines); 1st prize, £6, 2nd, £3; 3rd, £2.

Class 2.—Best ten leaguers wine of Sauterne type (white wines between Hock and Sherry type); the same.

Class 3.—Best ten leaguers wine of Sherry type (heavy white wines); the same.

Class 4.—Best five leaguers Sweetish White Wine (Madeira type); the same.

Class 5.—Best five leaguers Sweet White Wine; the same.

Class 6.—Best ten leaguers Stein; 1st prize, £4; 2nd, £2; 3rd, £1.

Class 7.—Best ten leaguers Green Grape; the same.

Class 8.—Best ten leaguers White French; the same.

Class 9.—Best five leaguers any other variety of white wine, unmixed; the same.

SECTION B.—RED WINES.

Class 10.—Best ten leaguers wine of a Claret type (light red wines); 1st prize, £6; 2nd, £3; 3rd, £2.

Class 11.—Best ten leaguers wine of a Burgundy type (full-bodied wines); the same.

Class 12.—Best five leaguers Heavy Dry Red Wine (Port type); the same.

Class 13.—Best five leaguers Heavy Sweetish Red Wine (sweet Port type); the same.

Class 14.—Best five leaguers Sweet Red Wine; the same.

Class 15.—Best ten leaguers Hermitage; 1st prize, £4; 2nd, £2; 3rd, £1.

Class 16.—Best five leaguers Cabernet de Sauvignon; the same.

Class 17.—Best five leaguers Pontac; the same.

Class 18.—Best five leaguers any other variety of red wine, unmixed; the same.

SECTION C.—BRANDIES AND LIQUEURS.

Class 19.—Best two leaguers Wine Brandy; 1st prize, £6; 2nd, £3; 3rd, £2.

Class 20.—Best two leaguers Dop Brandy; the same.

Class 21.—Best half-aum Van der Hum; the same.

Special prizes presented by Mr. J. W. Jagger, M.L.A.:—

Class 22.—Best ten leaguers Light White Wine; silver cup, value £5.

Class 23.—Best ten leaguers Light Red Wine; silver cup, value £5.

Full particulars are obtainable of Mr. A. A. Persse, secretary, P.O. Box 1134, Cape Town.

"C.O.D."—Collection Delivery.

The Railway Department is distributing an interesting little pamphlet shewing how farmers can be their own distributors if they will only take advantage of the "C.O.D."—or Collect on Delivery system, which was inaugurated some years ago by the railway management, but has never been largely used. "The working of the system is simplicity itself. Those farmers and farmers' organisations willing to cater directly for the requirements of consumers are asked to submit their names and addresses to the nearest station master, together with particulars, including approximate quantity of the articles they are prepared to supply. This information will then be furnished by the Railway Department to station masters at stations which may be regarded as distributing points for consumption, as for example, Cape Town, Port Elizabeth, East London, Kimberley, etc., and the lists will be readily accessible to all consumers. Having perused the list, the consumer will then write to the farmer or society he may have selected, that he is open for direct supplies of certain commodities. A penny stamp either way establishes their business relations, and prices and terms are arranged between them entirely on their own account.

"The Railway Department then offers its facilities. A sender wishing to take advantage of the ' Collect on Delivery' system hands to the officer appointed to receive the same at the sending station the package or packages, fully and legibly addressed, which he wishes forwarded, with the usual consignment note, and in addition thereto an ordinary commercial bill head or invoice form shewing the amount to be collected from the consignee for and in respect of such package or packages, irrespective of railway freight, together with any special instructions the sender desires to be carried out regarding delivery. The sender is furnished by the Railway Department in exchange with a receipt shewing the conditions under which the package or packages are carried, warehoused, etc. The Railway Department then conveys the consignment to destination, charging the usual freight, and delivers same to consignee, recovering from the latter on delivery the amount the sender wishes to be collected in respect of the value of the consignment, whereupon instructions are sent to the forwarding station to pay the amount recovered to the sender, less a small commission, etc." The commissions are most reasonable, amounting to 3d. in the £, with a minimum charge of 1d. It is surprising that more business is not conducted by this method, especially in such depressed times as the present, when there is still a large margin between the price paid by the consumer and that received by the producer.

Cape Wools in London.

The reports to hand from the London sales on recent offerings are still most encouraging. Messrs. Buxton and Ronald, in their report on the January series, said:—"The quantity submitted to buyers during the course of the sales amounted in all to 152,000 bales, and of these some 6,300 were from the various districts in South Africa.

On the whole they formed a good selection; in fact, the general run of the wools was distinctly above rather than below the average. Amongst others there were some particularly nice lots from Mossel Bay, a little short in the staple, but of good quality and light condition. Some of these had been skirted and packed according with the Government expert's advice, and from the keen and general competition which these wools commanded, it is easy to see how the efforts now being made to get the clips up more atractively are appreciated. Some good Kaffrarian combings sold well, one lot making up to 1s. per lb., the more general price being from 10½d. to 11½d. per lb. Westerns also made last December rates, the top price being 1s. per lb. Easterns made this figure also for some exceptionally well grown fleece. There was not much from the Orange River Colony, but a noticeable feature in the catalogues were some East Griqualand wools, which sold readily up to 10d. per lb. The softness of these wools is noteworthy, and the market would welcome some more of this class, especially if the skirts and all dirty matter were removed.''

Horse Sickness.

In commenting on the letter which appears on the above subject in the correspondence pages, the writer, Mr. D. Hutcheon, Director of Agriculture, says:—''I have read Dr. Walker's communication on the nature and cause of horse sickness with interest. Dr. Walker starts off by saying that the reason for submitting his views on the question is because 'his impressions of the disease are so opposed to the official and general opinion.' But, on reading his letter, it becomes apparent that on the main question—the originating cause of the disease—he is in general agreement with the official and general investigators, who have studied horse sickness, *viz.*, 'that it is communicated and spread by some biting flying insect,' the only difference being that while previous observers have unanimously blamed some nocturnal flying insect for being the medium of spreading horse sickness, Dr. Walker appears confident that the evidence which he has obtained is sufficient to convict a species of Gad-fly, which operates in the sunshine, of communicating the disease.

It must be admitted, however, that nearly two centuries of observation and experience are opposed to Dr. Walker's theory, and in favour of the opinion of such modern investigators as Koch, Theiler, Watkins-Pitchford and Edington.

''Dr. Walker further states: 'I do not see why horse sickness should be considered a malarial disease. It cannot be called endemic, when it comes at such long and erratic intervals; nor is there anything to denote that the microbe has the slightest kinship morphologically to the two-phase parasite of human malaria or bovine red-water.' He admits, however, 'that it cannot spread without the assistance of an intermediary insect, but apart from that, it extends over the country just as any epidemic spreads among human beings.' In this connection I would like to point out that the disease, which is described as 'Malarial Catarrhal Fever' of sheep may be considered, 'from an epidemiological point of view together with horse sickness. Both occur under the same telluric and climatic conditions. These are a moist country, rivers, and, in fact, all low-lying damp places. Furthermore, both diseases are principally noticed in seasons characterised by heavy rains, and are usually experienced during the latter half of the rainy season; further, they are both contracted principally during the night.' . . . 'Conditions that favour the development of insect life, especially that of mosquitoes, are favourable to the development of these diseases. If horses and sheep are removed from these low-lying, moist localities, and placed in stables or on elevated situations, the diseases are rarely met with. It has also been noticed that both maladies cease to exist, as epidemics, as soon as the frost sets in. Both diseases are easily inoculable with blood of a sick animal into susceptible ones of their respective species, but they are neither infectious nor contagious in the pure sense of the word. There is another close resemblance, both diseases are caused by an *Ultra-visible micro-organisation.*' (Theiler.) Hence, they cannot be morphologically compared with the parasite of human malaria, or that of red-water.

"With regard to the recrudescence of horse sickness in a locality after an interval of years, or, as Dr. Walker puts it, under such circumstances, how does the *first* fly become affected? Several explanations have been advanced to account for this. Dr. Theiler says (*vide Transvaal Agricultural Journal*, Vol. IV., No. 13): 'It is somewhat difficult to understand the recrudescense of the disease after an interval of years. This is the more astonishing because the immune animal does not retain the virus in its blood, and accordingly cannot act as a propagator of the disease. From analogy with other diseases we must suppose that the micro-organism is retained in the body of the insect, and remains there whilst it undergoes the evolution of its life cycle. Infected insects hibernate from one season to the other, and the disease is latent within them There is another way to explain the occurrence of the disease in those countries in which susceptible animals are rarely brought, and, therefore, cannot be made responsible for the maintenance of the infection, *viz.*, the existence of a host in which the micro-organism lives without causing any harm, and from which they are transmitted by the bites of insects. Such a host would probably be an aquatic animal. An analogy occurs in South Africa. In the Tsetse fly country game is immune to the disease, but carries the trypanosoma in its blood, which is transmitted from the immune to susceptible domesticated animals by the bite of the Tsetse fly."

"Dr. Theiler, in Bulletin No. 2, Transvaal Department, states:—'That horse sickness must have originated in South Africa with the importation of the first horses.' This is not borne out by the following historical record (*vide Cape Agricultural Journal,* Vol. XXIII., No. 2): 'The Dutch East India Company took possession of the Cape in 1652, and horses were introduced in the early days of the settlement. In 1665 the Company had more horses than it required, and sold sixteen at from £4 to £5 a-piece. By 1688, the horses had increased to a satisfactory extent, although they had deteriorated in quality; hence a number of Persian Arabs were imported. From this date the horses increased rapidly until 1719, when horse sickness appeared for the *first time,* and carried off a large percentage of them. In 1763, it re-appeared in an epizootic form, and carried off no less than 2,500 horses. Since that date, the visitations of this equine plague have been more frequent, as the industry of horse breeding has extended north and east from the Cape Peninsula. In some years, fortunately at long intervals, it passes like a wave over the whole of Cape Colony. For example, in 1854-55, it is reported that 70,000 horses and mules died of this disease alone, and in 1891-92, nearly an equal number were swept off by this plague. Upon this is is remarked that such wholesale destruction of a species of animal by a particular epizootic disease makes it probable that the absence of horses from Southern Africa, until its occupation by Europeans, was mainly due to the presence of this equine scourge affecting as it does the greater part of its area.

"The question arises, however, assuming that the disease is propagated and spread by mosquitoes (or some other biting insect), how did they maintain their infection without the existence of a susceptible host? The donkey can be infected artificially, but he does not die from its effects. It has been also shewn that the zebras occupy a similar relationship to the infective agent of horse sickness. Does it remain in the blood of these different species of the *genus equus* in a latent form ready to assume its virulent character under favouring circumstances when transferred to the horse and mule? Even in Rhodesia, portions of the Transvaal and Natal, where it occurs more or less every year, it does not assume the same intensity. Even in so-called horse sickness regions its appearance and character depend upon certain local and telluric circumstances or influences. For example, horses that are salted in one locality are readily attacked by the disease when brought into another locality where the disease assumes a more virulent form, which must have something to do with local conditions. Further, during ordinary years, the disease is mainly confined to low-lying, moist localities, but in seasons in which there is an abundance of rain, which are favourable for the breeding of such blood-sucking insects, the disease may be carried all over the country, even to the high veld. It is very evident also from Dr. Walker's own description of the manner and rapidity with which the disease spread, that in whatever way the first fly became affected, the other flies in the several localities to which the disease extended, were affected by the diseased horses which were brought to these localities, and the local flies or mosquitoes communicated the infection to the local susceptible horses and mules. But, as Dr. Walker says: 'We have still much to learn about horse sickness,' and his interesting letter will stimulate further enquiry.''

South African Meat in London.

Commenting on the meat, pork and dairy products at the South African Exhibition in London, the *Scotsman* remarks:—In so far as the meat trade is concerned, the interest is strictly limited in connection with the Exhibition which is now running at the Horticultural Hall, Westminster. In a general way, of course, all the multifarious products are of interest. The particular items, however, of meat trade interest are confined to some samples of hams and bacon, which hardly call for special comment. At the Press luncheon given on Friday last —the day previous to the official opening by the King—there was a large joint of beef which had come all the way from Orange River Colony, and judging from the rapid way in which it disappeared, it seemed to highly commend itself to the palates of the 100 or so Pressmen who sat down to the sumptuous repast. The export of meat from South Africa seems hardly within the region of possibility in the immediate future, but to judge from the example of Argentina, it is perhaps as well not to be too sure of this matter. When the flowing veld becomes tenanted with farmers, and means are found to prevent the devastating diseases which decimate the herds of cattle at present, then we may look to a new aspect of affairs. At present South Africa imports fresh meat; then she will begin to export it. Curiously enough, pigs thrive in South Africa better than any other farm live stock. They are comparatively immune from disease, and it looks as if the manufacture of pork products, such as bacon and ham, might become an interesting feature in the future. The samples of pork products exhibited at the Exhibition are certainly not encouraging, and it would be a desirable thing if the various Governments were to unite to get someone with technical skill who would give these industries associated with the pig a fair start. The butter is creditable, bearing in mind the fact that it has travelled so far under cold storage; but some of the samples display an absence of the knowledge of technical detail, which is so all-important in this industry. Butter-making, cattle-raising, and pig-breeding are inseparably associated together on the modern farm, and if the South African Colonies are to prosper in agricultural affairs they must clearly recognise these facts.

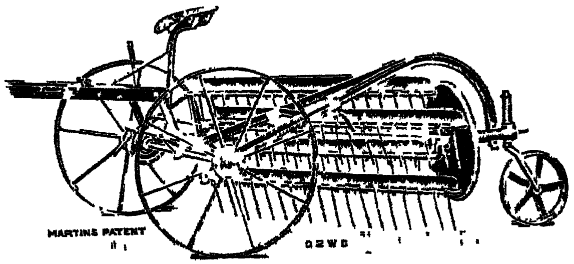
FARM AND VELD.

Glycerining Prunes.

A Worcester correspondent enquires as to the methods of glycerining prunes, and as others are doubtless interested we publish the reply, which was forwarded. The method adopted is to apply the glycerine after the sweating process. The usual system is to mix 1 lb. of glycerine to 20 gals. of water, hot, into which the prunes are dipped. This final hot dip kills insect eggs, and the fruit, after drying off away from the access of insects and dust, should be tightly packed in boxes.

Lucerne Side-delivery Rakes.

A common complaint in connection with the ordinary drop hay rake has always been that it does a great deal of damage when used for raking together lucerne. This class of crop requires very gentle handling, as otherwise the leaves will drop off and be lost; it is, of course, known to every grower of lucerne that the leaves are that portion of the plant which contain the greatest percentage of nutritive qualities. The side delivery hay rakes, which do away with this complaint, are an excellent invention. This implement was mentioned in the *Agricultural Journal* last year, but a further description of it should prove of interest to lucerne growers. We understand that similar machines are now manufactured by the McCormick Harvester Co., but we are not quite certain whether they are offered ~~in this country~~ at the present time; if they are not, however, they soon will be.



The accompanying illustration gives a very good idea of the rake which is manufactured in England. It is made somewhat on the principle of the Swath Turner, and handles the crop very gently, without damage to the leaves, and at the same time rakes the ground clean, without collecting dirt and stones, leaving the crop very light in a continuous windrow. This side delivery rake not only takes the place of the ordinary rake for all purposes, but can be used for a variety of other purposes, including collecting grass, brush harrowing, and for killing weeds, etc. Under some circumstances it can be used for the same purposes as the weeders, which have recently been found to be of such great benefit and utility in cultivation. As a collector for windrowing hay such as lucerne, this class of rake has no equal. One bout across the field puts four swaths into a straight windrow in perfect condition for forking, when loading can be immediately commenced. The principal advantage claimed for this machine, however, is that it will handle lucerne, however dry it may be, so kindly as not to damage this valuable fodder plant in any way. This implement has been used successfully in England, and has also been introduced into the Oudtshoorn district. It is stated to work eight feet wide, and weight is 5 cwt. 1 qr. Messrs. Malcomess and Co., of East London, kindly lent the accompanying electrotype.

Economical Wagon Wheels.

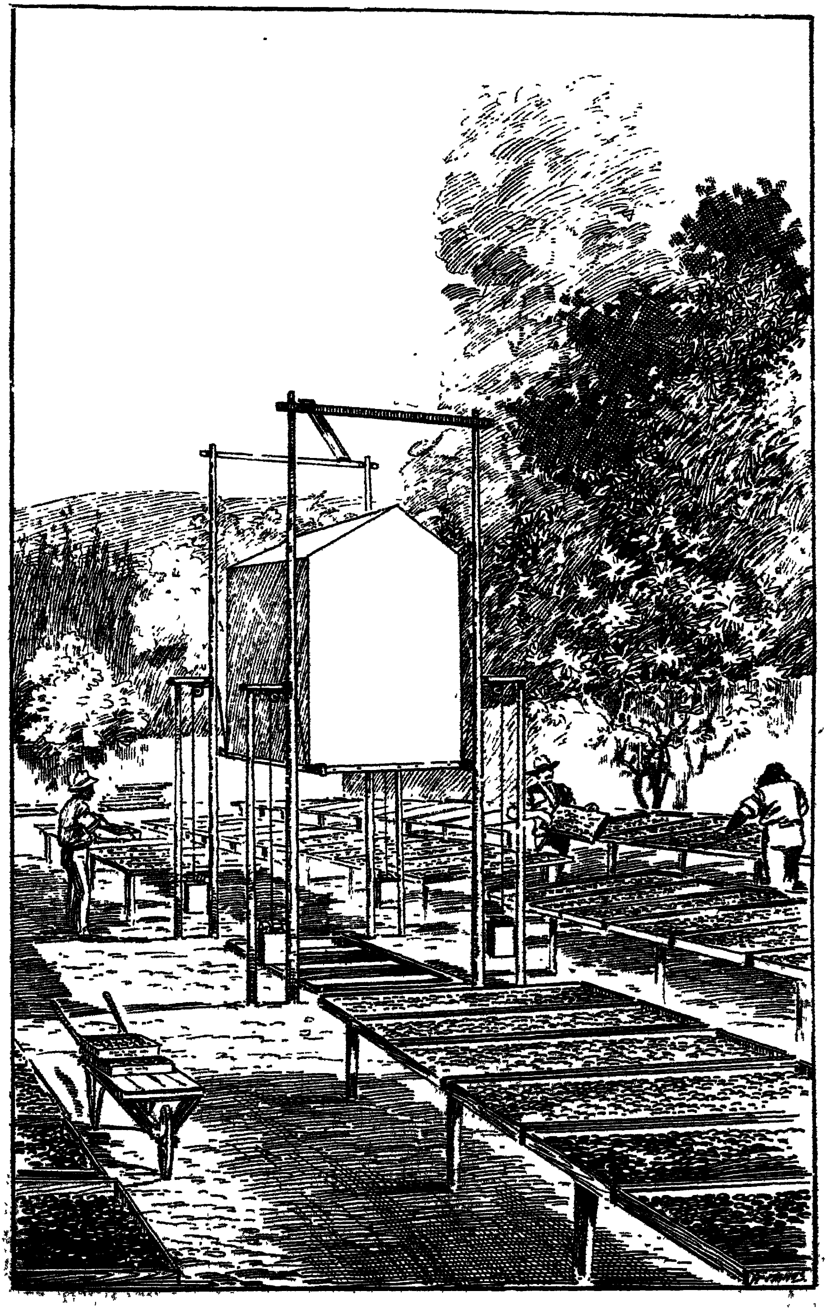
In the *Rhodesian Agricultural Journal* for August, 1906, writes Mr. J. M. Orpen, there appears on page 581 an article on the "Wagon Wheel for the Farm." It really deals with wagon wheels in general, and their effect on roads and draught, etc. The article alluded to previously published references to the subject. Might it not be well if your *Journal* would quote these articles, and give advice? It would appear proved that, in South Africa, wagon wheels for any heavy draught are universally constructed on antiquated and absolutely vicious principles, are dear and very short lived, and make draught much heavier than it should be, sometimes *doubling* it, and are exactly calculated to ruin roads well. The errors appear to be that the wheels here are partly made of wood, the tyres are much too narrow, the hind wheels generally are following in the exact track of the front ones. They thus double the mischief these have done, while, under new light, in many countries, such wagons have wheels made wholly of iron or steel, which are far cheaper, last much longer, and comparatively seldom require any repair, and they have tyres of a breadth unheard of in South Africa. The hind axle is so much longer than the front axle that the wheels make an absolutely different spoor—an inch or so outside that of the front wheels—so that, in the case of our transport wagons carrying 8,000 lbs., the tyres would be ten inches broad, and would be rolling and consolidating the road as with a heavy roller, 40 to 42 inches broad, instead of carefully cutting it to pieces.

Tyres for even a market cart to carry weight appear required to be at the very least four inches and up to ten inches broad, and for wagons to carry 3,000 to 4,000 lbs. must be *at least* six inches broad. There are in some countries now actual laws compelling this, under penalties, and in other parts, wagons are freed from taxation, or or taxed less, if having a prescribed breadth of tyre. Here hundreds of thousands of pounds must be wasted annually on our roads by the use of our antiquated wagon wheels, and would be saved in road-making and repairs by adopting a better wheel. Retrenching Governments, Colonies and colonists who have now to study severe economies ought to study this matter well. Farmers in Rhodesia are doing so, as appears from the article under reference. They are importing "handy farm wagons," or "light wagons for farm work" from America to take the place of the clumsy buck wagon on farms. The article says: "Two of these wagons were recently landed at Salisbury at a cost of less than £25 the pair, complete with the exception of flooring for the body, the length of which is adjustable. Standing on 30-inch wheels with 5-inch tyres, they are very readily loaded and unloaded, can be driven without difficulty over ploughed lands, and have, in general, given such satisfaction that a co-operative order for a further twenty-four wagons has, we understand, already been placed. Those first imported have now been use for over six months without receiving any repairs, and are practically as good as new. In the event of an accident new wheels may be purchased at the comparatively trifling cost of four dollars (16s. 8d.) We regret to find, after extensive enquiries, that this type of wagon is unobtainable in Great Britain at any figure approximating to those quoted by the American firms, who are at present engaged in meeting an extensive and rapidly growing demand for this line." A farmer is quoted as writing that they are getting out American wheels to replace wooden ones on Cape wagons, and that this "Handy wagon," with six oxen, will do twice the work of the big, old, long-teamed buck wagon with less trouble, and that the broad-tyred wheel is best for every sort of road—rocky, muddy and sandy. It is evident that our Colonial wagon makers and English manufacturers will have to wake up and get abreast of the rest of the world, or they will be left out in the cold with regard to supplying wagons to farmers in South Africa, as in many other things.

More than a dozen years ago, continues Mr. Orpen, I drew attention to an article which appeared in the *Nineteenth Century*, written by Mr. Waddingham, the then French Ambassador to England, who knew both countries well. He dealt with the whole system of local rural self-Government in France, and mentioned that the roads there were better kept than any others in the world. One of the things he mentioned was the regulations regarding *wagon tyres*. As regards local rural self-Government, which produced all the excellent results, he mentioned this Colony requires as much making up as about wagon tyres. Nothing like its present system has ever succeeded in the whole world, and this Colony should study the systems which give splendid results in France, America, etc.

The Nicholson Sulphuring Chamber for Dried Fruit.

Anything that is calculated to help the small producer in the preparation of his output is of interest at the present time, because it is the small producer who is being most severely handicapped, particularly the fruit grower. The markets for fresh fruit have been seriously congested during the present season, and though the grower is offered a fairly remunerative return for the dried article, and the demand for that should increase as the importations fall off, it means a certain amount of capital to utilise a crop or even a portion of a crop in this way. Any device, therefore, that promises to assist the small man in this direction is welcome. One of the troubles is the provision of a suitable sulphuring chamber which can be constructed at little cost and at the same time be effective, and Mr. A. Nicholson, of Schoongezicht, near Stellenbosch, seems to have gone a good way towards solving this problem. He has constructed an apparatus which can be made by any farmer which answers fairly well in the experimental stage; and when developed a little further will probably become a recognised means of sulphuring. The ordinary method at present in vogue is the construction of a chamber of brick or masonry work, the laying of light rails from the drying ground, and the carriage of the wooden trays upon which the fruit is dried to the chamber on low trolleys. The pile of trays being run into the chamber, the door is closed, the charge of sulphur is fired, and the fumigating proceeds. Mr. Nicholson's system is a much simpler one, as can be seen from the illustration herewith. He has constructed a box-chamber, which is hung upon a scaffolding by pulleys balanced by counterweights. A trough is hollowed in the ground underneath, in which wooden bars are laid, forming a tressel upon which the trays of fruit are piled. When the requisite number of trays are in position, the box or chamber is lowered, the charge or sulphur lighted in the trough below, and the fumigation proceeds in the usual way. The addition of the counterweights makes the hoisting of the box when the fumigating is completed a very simple matter. Mr. Nicholson uses as counterweights ordinary four-gallon paraffin tins, weighted with stones. Thus, the weights can be increased or reduced as needed with the least possible trouble. The principle is not entirely new, as such appliances have been tried in California, but instead of being hung on pulleys they had to be lifted on and off by hand. In that case the covers of the box or chamber were much lighter, being made in most cases of calico, or other textile fabric. They were found to be faulty, being both leaky and easily destroyed in case of a high wind. In Mr. Nicholson's case, he uses plain galvanised iron as the material for covering the frame work of his chamber. But this has serious objections, for the action of the sulphuric acid in the sulphur fumes attacks the zinc on the iron, and it is precipitated in the form of a white powder, which is largely sulphate of zinc. This will have to be remedied, as sulphate of zinc is poisonous, and it is now proposed



Nicholson' Sulphuring Chamber for Dried Fruit.

to cover the inside of the iron with tar or paint, and see if that will not resist the corrosive action of the acid. The contrivance is so handy and inexpensive that the question of the material of which it is constructed should not present an insuperable obstacle to its ultimate success, and we hope to hear soon that it is a complete worker from every point of view. Mr. Nicholson, as will be seen from the illustration, has the apparatus erected in the centre of his drying ground, which is a sheltered spot surrounded by oak trees, and thus handles all his output with the minimum of labour. Being sheltered from the wind, there is less chance of dust and dirt getting blown on to the fruit while it is drying.

Devonshire Cream and Cream Cheese Making.

With the growing interest in dairying that is springing up in the Colony the day cannot be far distant when such by-products as cream cheese and Devonshire cream should be available to consumers willing to pay for such luxuries. Cream cheeses are now supplied in Cape Town, and a fairly good business is being established in them, but we know of no suppliers of Devonshire cream. The best demand for such commodities should be at the seaside resorts in the summer, when visitors are down from up-country, for as they are luxuries they are only bought occasionally, and it is not advisable to place more than small quantities at a time on a market, and fix the price as reasonable as possible. As these articles form an excellent medium for turning surplus supplies of rich milk into profit we append a few particulars as to their preparation, extracted from Leaflet No. 179 of the British Board of Agriculture.

Cream Cheese.—A pure, rich milk produces the finest cheese. It is not possible to make first class cheese from stale or acid milk as the curd drains too rapidly. In some varieties of cheese the curd is cut or sliced in large pieces, the object being to retain much of the moisture; the smaller the curd is cut the more rapidly the whey drains off.

Varieties of Cream Cheese.—Cream cheeses may be made of two qualities, (1) those from double or very thick rich cream, (2) those made from thin cream, or cream to which a portion of milk is added.

Double Cream Cheese.—For the manufacture of this cheese thick cream is necessary. If the milk is separated, the separator should be regulated so that the milk yields 6 to 8 per cent. cream; or, in other words, 6 to 8 lbs. of cream from every 100 lbs. (roughly, 10 gallons) of milk passed through the separator. The cream as obtained from the separator should be cooled to 60 degrees F. in summer, and 65 degrees F. in winter, and then placed in a fine-textured linen cloth, previously rendered sweet and clean by thorough scalding with boiling water. Sweet shallow-pan cream may also be used, and is treated in a similar manner. The cloth is best laid in a basin, and the cream poured into it, after which the four corners of the cloth are taken and tied together, so that it resembles a bag containing the cream. It is better not to put more than one gallon of cream in the cloth, as drainage is not easy with more than this quantity, and the cheese is apt to become too sour. The bag of cream should be hung up in a cool, dry place to drain. Three times a day the cloth ought to be opened out and the sides scraped to remove the stiffened cream in order to facilitate drainage. At the second scraping down, the cream should be transferred into fresh cloth. It is sufficient if the cloth is changed once only, though if done more frequently rather better results are obtained. The cream will be sufficiently drained in about two days, but the process may be accelerated by opening out the cloth and scraping down frequently, and by placing a small weighted board on the cloth containing the cream. When the cheese becomes of a stiff, pasty consistency it should be emptied out of the cloth, and a small quantity of fine salt mixed with it preparatory to moulding; this will bring out the flavour and assist the keeping properties of the cheese. It is customary in some cases to salt the cream, instead of the actual cheese. The cheeses are turned out in square, oblong, round, heart-shaped, and other forms, according to the type of mould used. The cheeses may be removed from the moulds at once, and are then ready for sale. They remain in good condition for from one to two weeks. They may either be done up in grease-proof paper and placed in small cardboard boxes, or done up in butter muslin and afterwards wrapped in grease-proof paper, in which case no box is necessary. The cheese sold retail in England at sixpence is usually of about four ounces weight, and a gallon of rich cream should make about sixteen cheeses.

Ordinary Cream Cheese.—This is prepared from thin cream taken from the separator at the rate of 12 per cent. or from thicker cream to which milk has been added. It should be cooled to 60 degrees or 65 degrees F., and 1 c.c. of rennet added to each half-gallon of cream. It should be allowed to stand for about 12 hours to thicken, and then ladled into cloths and treated in a similar manner to double cream cheese. This variety of cream cheese contains a much greater proportion of curd, and is not nearly so rich as the double cream cheese.

Devonshire Clotted or Scalded Cream.—Though originally confined to the counties of Cornwall and Devon, the manufacture of clotted cream is now carried out most successfully in many places. In addition to its having gained a great reputation as a luxury, it is now largely recommended by the medical profession as an excellent fatty food, and is displacing to some extent the use of cod liver oil amongst invalids. Devonshire cream is very rich, containing from 50 per cent. to over 60 per cent. of fat, and this fat is of a more digestible kind than any other, being present in the cream in a finely emulsified condition. In the preparation of clotted cream it is desirable to use rich milk, such as is produced from the Channel Island breeds of cattle, but this is not essential, and the evening's milk from Shorthorn cows will produce very good cream indeed. In Devon and Cornwall clotted cream is largely made from the milk of Devon cattle, which are admirably suited for the purpose. Crosses with Channel Island cattle are also commonly employed

The cream is prepared as follows:—

1. Whole milk, warm from the cow, is carefuly strained into setting pans. The pans most suitable for the purpose hold about six quarts of milk, measuring fifteen inches across the top, seven inches in depth, and eleven inches across the bottom: they are, in fact, similar to "shallow pans," only deeper.

2. The pans of milk are left undisturbed in a cool dairy for the cream to rise. In summer, twelve hours or less is the time allowed, but in winter twenty-four hours is usual.

3. The pans should now be carefully removed and scalded, great care being taken not to disturb the cream on the top of the milk. Scalding is carried out by placing the pans on a hot-water stove, and allowing steam to play upon them until in not less than half an hour's time they have attained a temperature of 175 degrees to 180 degrees F., when they are removed, and either allowed to cool naturally, or are cooled by placing them in a stream of cold running water. The scalding should not be done too quickly, otherwise the characteristic scald flavour is not produced. The heating may be carried out by placing the pans on a kitchen range or hob, but the hot-water method is preferable.

4. When cold, the cream may be taken off in a thick clotted condition, and is ready for sale. In summer it is especially advisable to cool the pans as quickly as possible after scalding, as this ensures extra keeping properties.

The cream is generally sold by the pound. One pound of cream may be obtained from one and a half gallons of Jersey milk, or less; whereas nearly two gallons of Shorthorn milk may be required to produce the same quantity of cream.

A TREATISE ON

CITRUS CULTURE FROM SEED TO FRUIT,

Shewing the Influence of the Stock.

By W. E. Masters

(Formerly of Grahamstown, C.C.)

(*Continued from Page* 325.)

CHAPTER IX.

Training on the Masters System.

Mention has been frequently made in the preceding pages of the "Masters System" or "Training." It has been gradually led up to, so that the reader might be able to more or less recognise its importance by what it is able to accomplish in the way of fruit-production. The reason for this gradual unfolding is that the system as a whole is so artless, so clear, so easy to understand, that unless the issues had been first explained, it would have been very hard to believe that on such seemingly trifling matters hung such momentous issues. Nevertheless, it is true. Truth, like art, is always simple, and the greater the truth, the greater the ease of its comprehension—and let me add also—the greater the chance of missing it altogether. The first impression of the "Masters System" is, I admit, one of annoyance and disappointment; the second probably one of rage at not finding out such trifles before, for which I tender my regretful apologies: as to the "third feeling," which inclines towards pronouncing it "all nonsense, or it would have been found out long ago," I claim my prerogative to express an opinion, and offer a guide.

I am prepared to admit that it may have been known hundreds of years before I was born, but with polite insistence I maintain that it has never been known or recognised *as a system* before: neither with regard to grafting creating a stock specialisation, nor as to soil training, nor as to abnormal abundance of fruit, or growth as the case may be. If the reader happens to be an authority in some branch of horticulture, and a pet theory is exploded or substantiated. I submit that whether favourable or unfavourable. TRUTH will stand, and nothing will stand, and nothing can make it a lie. If the reader will concede that my discovery of *one* letter proves the presence of an unknown alphabet, would it not be better than mere carping criticism to carry it to the next stage, and shew the uses to which that alphabet may be put? Who can say to what one may not attain? How that alphabet was first discovered and the trifling accident that furnished the clue, will be set forth in this chapter, and it will be for the reader to improve upon it.

The "Masters System" as a whole is no accident, but the result of years of careful study and experiment that gained knowledge which has been proved hundreds of times, not by my own personally executed and finished work so much as by the longer established efforts and in the orchards of other growers which I have visited. Speaking personally, I might define myself as one who made a discovery, and proved it by the finished works of others. Finding a negative point, I proved its positive by contra-indications and *vice versa.* A careful study of the "common-sense" of the "Masters System" will be found to explain much that hitherto has been misunderstood and inexplicable, especially with regard to duality of fruit on one tree from the action of the specialised stock on the forces in the blossom. It seems unnecessary to recapitulate what has already been said, but the aspect of Root-rot in breaking the continuity of systematised orange-growing, and the wide-spread distribution of high-grade varieties with consequent loss of specialisation, should not be treated as inconsequent.

Training Refractory Scions.

The first essential in a fruit tree from the practical view of the fruit-grower is *fruit,* not in samples, but in the largest possible quantity combined with excellence, tree for tree, acre for acre, with the certainty of profit at maturity. To gain this—too often glibly promised goal—much has been invested by the wealthy, and comparatively more risked by the working fruit-grower, and unfortunately in many instances it has proved to be a bad speculation. Hopes have been raised and courage lost because there existed no definite foundation of actual recorded knowledge whereon to build with certainty. The Masters training system, combined with the knowledge of stock factors hitherto lacking, meets this case fully and entirely, and although much might be said with regard to its future possibilities, facts are better arguments. Therefore, in citrus-growing, if we take the behaviour of the Washington Navel Orange when budded or grafted on to the Seville stock as an illustration of the most refractory "scion and stock" known, and carry the training through to completion, it will be seen, stage for stage, from its first compulsion until its finished training, in what way such training differs from that of other scions, less variable or refractory, and requiring less specialisation or previous manipulation.

With regard to the Seville stock itself, it may be remarked that it is a free grower in moist rich soils, but is unfitted for dry, open loams. It is also a true stock unweakened by selection. The objective now is to make one or more "Washington Navels" thrive on Seville stocks for use as propagating trees, wherewith to bud or graft many hundreds or thousands of similar Seville stocks with a Washington Navel scion specialised thereto. Having carefully read "Transplanting," and possessing Seville stocks ready for transplanting, we plant 100 of them in a loam, or in a soil similar to that of the future orchard, about 15 inches apart and 30 inches between the rows. There they remain for about a year receiving attention as they need it, and are trained up to one single shoot. all side branches being rubbed off as they appear.

These stocks (called two-year-old) are now divided into two blocks—50 in one, which we call *A* block; the other 50 in *B* block. They may be divided by rows, or pegs, or in any other way, the main object being to avoid confusion, and to see that the whole 100 stocks have similar soil and moisture.

Having studied the chapter on "Seville" on "The Science of Budding and Grafting," and presuming the stocks are just throwing out new eyes in the branches, as well as the ground being moist, we *cut down* the 50 Seville stocks in Block *A* to two inches, or even less, above the surface roots. The stump should receive a small dab of thick white-lead paint to preserve the wood from future decay; but if the sap is flowing very freely, the paint will not adhere. Soaking rains frequently cause this "bleeding," but the paint should not be omitted when they dry, which will happen soon afterwards. If the ground be full of rain, budding may be performed at the same time as they are cut down, but if rain has not fallen recently and the ground has only been moistened by irrigation, a few days should be allowed to elapse between cutting down the 50 in A block, pending the appearance of the first sprouts. When these sprouts are about an eighth of an inch long, the stocks are in the best possible condition for grafting or budding, and any amateur can then succeed as certainly as the "professional." It will be noticed that the short two-inch stump is green towards the top and whiter nearer the root; the bud or graft should be placed about the middle, nearer below than above the centre. A straight cut is made from the white portion right up to the top of the stump, sufficiently deep to reach the cambium layer (the soft inner bark) without injuring the wood below it. At the top of this cut, the little portion of paint adhering to the bark should be snicked off, and a little piece of the wood of the stump at the same time with the knife used for budding; this allows the bud (or graft) to be easily pushed down from the top to the right place, without carrying any paint or dirt down with it.

Choosing the Scion for the First Stage.

If we cut the scion ourselves, we shall probably know on what stock the Washington Navel is growing from which we choose our bud-wood: and if we also know that any tree growing on a lemon stock is disliked by a Seville stock, we shall do our best to avoid a *lemon* stock as being hard to train. The best scion to choose, if choice is possible, is one growing on a Seville stock already, but as this illustration is purposely chosen to shew how the most refractory scion may become specialised to the Seville stock, we choose a Washington Navel scion that thrives best on a lemon stock, as offering the most trouble. It should be remarked that the younger the tree is from which we cut our bud-wood, the more the growth will be pushed on, and often at the expense of fruit. It is not always wise to choose young trees for bud-wood; on the other hand if we take a scion from a tree that has but little "scion-vigour" we lose the force of the scion's persuasive "call" on the stock. We, therefore, choose a middle course, and cut our scions from the ripest, stoutest, topmost twigs of a fairly robust tree. Whether the scion is growing, or only just stopped, makes but little difference, although the preference should be given to ripe, fully-swelled, firm and uninjured buds or grafts. No more scions should be cut than can be disposed of in the next fifteen minutes if the weather is hot or dry.

We now cut our bud as shewn elsewhere, and push it down the long, straight slit as far as it will go easily, and sufficiently far to take all of the bud. Lash it up tight with raffia, tighter above the bud than below it, to keep out rain and air. Fasten it off with two half hitches, and wax the slit from top to bottom. If the bud is ripe, it can be lashed as tight as the raffia will allow without actually breaking it. Neither the stock nor the bud will be injured by tight binding for a short time. The whole length of the slit should be tied up, and if the bud happens to be slightly hollow in the centre, lash it tighter there to press it on to the wood of the stock, taking care not to cover the eye. It may then be shaded from the sun or other hurtful influences, because everything not in its favour at this stage is doubly against it.

After Operations.—It will be noticed in a few days that some of the buds are moving, and most probably also several new stock-sprouts have pushed out. Ten to fourteen days may now pass without other attention than weeding or watering if either is necessary, and then the raffia should be cut through with a sharp knife, taking care not to injure the bark. There is less danger of injuring the bud by cutting the raffia through than there is by untying it. Gardeners usually compel their assistants to take it right off as they cannot trust them to cut it. The next step will be to remove all the stock-sprouts with the exception of one nearest the top of the stock on the side farthest away from the bud. This sprout must be attended to quite as carefully as the bud, for three important reasons, *viz.*:

(1) To form the stem of the future stock on which to bud again at a later stage. (2) To act as a "control" for the bud, in order to say presently which of the fifty buds in Block A have made the most spontaneous growth by natural affinity to the stock. (3) To shew the relative strengths of the various stocks, to serve as a guide for bud or graft choosing later on, if no book has been kept, or no numbered pegs made.

Everything now must be allowed to remain until both the stock-sprout and bud are ripe, the only exception being stock-sprouts, which should be kept limited to the one above mentioned. Ripeness of wood is shewn by the leaf-buds beginning to swell, as if they would soon be starting, after a period of inaction.

Selection of Wood for the Second Stage.

The fifty buds put on to the fifty stocks in Block A, hereafter to be used for the other fifty in Block B, have now to be considered, and carefully compared, bud with stock sprout, right through. It will be noticed there exists a wide difference, some from various reasons having remained dormant, others having small, weak scions with a strong stock-sprout, indicating but little affinity or liking; and these should not be chosen if other sufficient growth exists wherewith to make grafts. Some buds may be dead, or possibly it may be that all have taken, and each present a different aspect; however, after having gone carefully through the lot we select the straightest, roundest, strongest growth having one single stem for the first choice, and the smallest comparative or proportionate stock-sprout. A scion of this nature is calculated to give the most vigorous growth and the best shaped tree, but of low average fruiting capacity. In the event of there being insufficient of this quality to *graft* Block B, we take as second choice scions of the same build, but smaller; after which we choose scions with two twigs of a robust character, and so on, finishing up with the smallest or weakest scions, having one twig only.

If there is insufficient wood to *graft* the fifty in Block B, we must perforce use the strongest first selections for *budding*, but this must be borne in mind, that a *bud* unduly forced by a cut-down stock will carry a larger proportion of *stock-influence* than *a graft*, notwithstanding those who claim the right to teach affirm to the contrary.

On young two-year-old stocks, a bud half an inch long will take quite easily, if put on true. The strongest, straight stick, with the smallest proportionate stock-sprout, shews the most growth affinity, provided nothing has happened to shorten the growth of the "control" sprout. Having selected our scions, we enter them in our notebook, as also on to which of the fifty in Block B we shall graft them.

Second Union in Block B.

The time for cutting down the fifty stocks in this block, whilst dependent principally upon the state of their growth, must also be considered with regard to the stage of ripeness in the scion-wood of Block A, because should the scion-wood be cut before the stock-sprouts in Block A have started, the scion is less active and less likely to "call" on the stock, or to accept the offer of the stock. Therefore, when the stock-sprouts in A are starting to grow, the stocks in Block B may be cut down to four or five inches above the first surface roots, smoothing off the tops and painting as before. A record must now be kept of those budded or grafted with first selection, second selection, etc. Such a record will reveal much that is inexplicable to the student at this stage, unless he has read the chapter on "Mongrelisation," or understands the variable nature of buds.

Block B having now been grafted or budded some four or five inches above the root, the same process is repeated. That is to say, one control stock-sprout must be allowed to grow on the opposite side to the graft, as nearly as possible at the top of the stump, which is tended as carefully as before. The higher a bud or graft is inserted on a stock the more chance the stock has of asserting its own growth, and the less growth the scion will make, proportionate to its more or less affinity or attraction. Therefore, if a stock-sprout is allowed to grow out strongly *below* the graft or bud, the graft is handicapped by its position; and a sprout growing just above the bud equalises the chances. If, as said before, the stock is cut down and allowed to sprout *before* the graft is inserted, it is advisable not to rub these tiny sprouts off until the graft is tied and finished, as probably one of these tiny sprouts is in the best position to test the affinity of the graft, and another sprout may not grow in so favourable a position for our purpose.

Block A now requires consideration, and as the scions in this block have served their purpose, they may be cut out, and the wounds painted. The object now is to keep all the growth into the control sprout, which will form the future *stock* on which we shall graft or bud again from Block B's growth. As soon as the buds have been cut off we change the name of Block A to Block C, by which name it will now be spoken of.

Selecting Scions for Third Union Grafting from Block B.

It is unlikely that any of the fifty buds or grafts grown by the *B* stocks will have equalled the growth of the control stock sprout, seeing a Washington Navel grown on a lemon stock was chosen as illustrating the refractory scion; thus, when we begin to examine the ripe growth of Block B's scions we shall probably find that although somewhat better than those of A, they cannot be said to be *trained*. However, in making our selection now wherewith to graft or bud again the C block, we omit any bent, scraggy or thin ones from our selection. Some will be noticed with the buds close together, thick "chubby" wood; other buds farther apart, some angled, or again drooping. Each of these styles will serve a certain purpose, and may assist in rectifying some known defect in the tree. Each type again, if carried to excess will exaggerate certain peculiarities manifested by their growth. Thus, buds close together, and thick, chubby wood, indicate a tendency to bushy heads, etc., or buds far apart with plenty of length between, indicate a tall or free-growing tree—that is, of course, if no untoward event has compelled the scions to adopt this habit, such as the breakage of the stock sprout, wind, etc. In dealing with the Washington Navel, its defect in this country seems to lie in too ample bearing whilst the trees are still small, and would be doing better service by growing *wood* instead of fruit. Dry seasons and shortage of water have something to do with this defect, as also it is the nature of a "seedless" tree to fruit heavily; nevertheless, it is a very delicate matter to persuade an early-bearer, and an under-standard sized tree like the Washington to assume a more vigorous growth habit without in a measure detracting from the excellence of the fruit. Merit in fruit is often like the intellect in an individual; it is not always the biggest man that has the most brains!

To bring a tree into early bearing, ripe new wood from very young trees should be avoided: and to postpone early bearing by the use of such *young*, new wood; nearly always (so far as my experience extends) goes too far the other way, and depreciates the fruit as well; therefore, without drawing too hard and fast a line, we choose the most vigorous, upright, single-twig scions to *assist* in checking early bearing and dwarfish growth at one operation. It is always wise to reject drooping growth, except with lemons, which often make a too-upright growth. Should any scions on Block B be found to have exceeded the control sprout, they should not be selected for grafting or budding on Block C at this stage, but should be allowed to remain and expend their strength over two more growths at least, before either grafts or buds are cut wherewith to bud or graft other Seville stocks. When the scion outgrows the stock-sprout, it may be said that for all general purposes such scion is "specialised" or trained to that stock, and henceforth it may be used for budding or grafting similar stocks.

It must be remarked once more that this case illustrates training a *refractory* scion, and it does not at all follow that the best method is being adopted to produce the highest grade of fruit. It is quite true that "training" can produce abundant growth, the highest possible grade of fruit, together with great carrying capacity; but it is most unreasonable to expect it to produce a fruit of the known excellence of the Washington Navel (that is, *as I know it* OUGHT *to be*) from a scion grown on a *lemon* stock, and whose training on to the Seville is substituting "Seville flavour" and Seville influence to add to the inferior compounds already existent in such a highly-mongrelised fruit. As things are, we cannot alter its *name*, but we shall further damn its reputation as a very mediocre fruit. We shall produce an *orange*. Yes;

but not of the excellence it is reputed to have, for the reason that past indiscriminate mongrelisings have shewn the high grade seedlings, grown so plentifully in the Eastern Province, surpass it in flavour and merit in every possible way. Merit to be maintained must first be found.

To return, then, to Block B. The test for growth in the scion is shewn by the growth of the stock-sprout allowed to accompany it; and until the scion-sprout *almost* equals the growth of the stock-sprout the "second union" must be made again, forming a "third" union, but must be made in a "second union" way. To make my meaning quite plain it must be said that a "training first union" is a scion from any adult tree, budded down *low*, almost on to the root of a stock that has been cut down short. That a "Training second union" is by preference *a graft* grown by the previous first union, taken when it is ripe, at the end of its first growth, and grafted on to the same kind of stock again—some four inches higher—also on to a cut-down stock. But a "Training third union" is a graft or bud inserted some ten to fifteen inches above the surface of the soil, usually at the foot of the main branches on a growing stock *not cut down* until later. Therefore, if the growth at second union has not quite equalised with the growth of the control stock-sprout, a *third* union must be made, but in a second union manner. Some coarse types of oranges will outgrow the Seville sprout at the second stage, but the finer the orange happens to be (say, the Washington Navel) that we desire to reproduce, the greater corresponding probability will exist of its having been highly mongrelised before we can obtain scions.

This splendid orange, so far as concerns the greater part of South Africa, is living on a reputation of what it *has* been, no one having assessed stock-influence, nor how its ill effects may become controlled. Take as a further instance the Jaffa orange. I have been reliably informed by an intelligent Armenian that the system of budding on to other local stocks sensibly depreciates its excellence, hence their methods of propagation now, as formerly, consists of hammering straight orange sticks into the ground which produce "struck" trees, excellence being thus maintained. Or, as a still further instance, to which I am indebted to Mr. C. P. Lounsbury, this latter gentleman being informed when in Bahia, that they use two kinds of Seville for stocks, one termed "laranga tanga," which, whilst giving a larger percentage of budding failures than "laranga de terre," imparts especial size and flavour to the fruit; whereas the latter, although easier budded, produces fruit inferior in size and flavour to the former, notwithstanding many affirm there is no such thing as stock-influence.

Excellence is produced by the seed, and depreciation by budding and grafting on to inferior stocks, in conjunction with the influence of soil-factors developing or diminishing their sway.

Selection of Grafts or Buds for Third Union wherewith to Bud Block C.

Having duly estimated the importance of the previous digression, we must now consider the appearance of the buds and their position on the stock, if budding, in place of *grafting* be resolved upon. Cutting off the straightest one-twig scion, we presume it to have a total of thirteen eyes or buds. The three, or four, buds at the bottom of the stick will probably be found too flat for our purpose, and should be used for neither budding nor grafting, as they frequently fail to sprout.

The efforts made by the grower in breaking off stock-sprouts to "assist" bud-sprouting, has a very detrimental effect on the vitality of the stock itself, which, if persisted in, may permanently injure the tree, or cause its roots to decay. The next six buds upwards are the first choice for budding or grafting, leaving the extreme topmost three or four to insert as a short three-eyed graft. If there are plenty of straight, stiff shoots, *graft* the whole fifty in Block C, but to illustrate the selection of buds, it is best to use only the three or four central buds, nearer the *top* of the bud-stick than below it, in order to obtain the best fruiting result with the greatest vigour.

Third Union Grafting.

Presuming Block C to have grown strong enough shoots for grafting from Block B scions, we graft them; but if the stocks have *not* grown shoots strong enough, and no other stocks are available, then Block C must wait.

A stock or sprout as thick as one's little finger is a good, serviceable size, but the thickness of a lead-pencil is just as good, although perhaps easier for budding than grafting. The stocks for third union training are *not* cut down, but the graft or bud is inserted in the usual T slit at from nine to twelve inches above the ground. The higher a bud is inserted the less chance the bud has of asserting itself, and the more the stock-growth can handicap it, if sprouting from below the bud. If we insert a bud *above* a stock-sprout, the bud cannot outgrow such stock-sprout, unless it can monopolise by more favourable attraction stock juices that otherwise would not be shared by it.

If such bud does happen to outgrow the sprouts produced below it, it is attributable to two causes: (1) Its natural affinity to the stock being more favourable than the branches; or (2) its stronger vigour, successfully fighting the lesser trained, and therefore weaker natural stock branches.

In dealing with the Seville stock, itself a standard-sized tree in moist situations, there seems little to be gained by over-training from every aspect; thus it may be said that when the growth of any scion has equalised with the growth of the natural branches, whatever mongrel influences have been absorbed from the stock, or stocks, must be carried by the tree as long as it lives, it being an irremediable permanency.

When is Training Completed?

Notwithstanding the infallibility of "The Masters System" to produce ample growth, it is, as said before, totally unable to supply flavour, unless upon high-grade stocks, and in virtue of the beauty of flavour naturally innate in the scion to commence with. The system—itself a simple following of nature's laws—can do nothing unnatural. It may, however, be accepted as a general rule that the *growth system* has reached its proper stage when the scion grows as freely on the training stock as the corresponding growth of the control stock-sprout, which may be at "second union," or in very refractory cases, not until "fourth unions" have been made. The higher the grade of the stock-orange the more the training may be continued without depreciation; nevertheless, the continuance of the new wood factor will make the ultimate trees barren for years.

Growth and fruit must balance each other, and the conditions favourable to both must be studied, it being impossible to set them down in writing.

The proper growth system may be reached at first union, when the stock on which the scion is growing and the stock upon which the bud will be placed are identical; provided that the proper growth with fruiting capacity was exhibited upon or possessed by the tree from which the mature scion was chosen. If the tree from which we choose a scion was an adult tree, scion vigour will not be manifested, but affinity will take its place; nevertheless, strong forcing stock-growths should be avoided.

In concluding this chapter, it may be better to accentuate one point again. In our Block "B" operations it will be noted that we select the most vigorous shoot in order to overcome the known dwarf habit acquired by the Washington Navel, as well as to obviate too early bearing. If, however, we had allowed that shoot to diffuse its strength in producing branches for two or three further growths in place of taking it at its highest "youth," such growth-vigour would have been lost; the "early bearing" would have been continued, and nothing but the slight affinity so won would have remained.

CHAPTER X.

THE LEMON STOCK.

The lemon, known also as the wild lemon, common Cape lemon, rough lemon, Mazoe lemon, or even as the common wild lemon, etc., etc., is of all stocks in this country probably the truest to seed. It has never been mongrelised and weakened by crossing: thus its very faults, not being worth "improving," stand it in good stead as a true experimental stock.

It seems rather mean to condemn an old acquaintance that supplied the whole of the estimative information that worked out "stock-influence," not to mention "scion-influence" and "growth," as well as providing the foundation from which positive points were evolved from negative ones; nevertheless, the facts will speak for themselves.

The wild, or Mazoe, lemon is, in my opinion, an undoubted good resistant *tree*; but a resistant *stock* it is not, notwithstanding many affirm to the contrary.

The root formation of the Mazoe lemon and the seedling orange are practically identical, both having a natural supply of surface feeders, as well as good tap-root systems, the outcome of long climatological training.

In setting forth the facts upon which the lemon, as a stock, is condemned, it should be understood that what the lemon can accomplish in the matter of growth and size of fruit, the seedling orange can do as well, or even better; but the Seville and the pamplemous cannot equal, or even compare with the lemon, except in soils, as perfectly adapted to the requirements of their distinct root-formations, as the soils and meteorological conditions of South Africa fulfil that of the lemon.

As set forth in Chapter II., "Influences affecting Seed," the lemon furnished the first clue to stock-influence; thus, after pinning one's faith on to one's favourite stock, it must not be supposed that that favourite stock is condemned without financial loss and ample trial.

It was in 1898 that I grew a very fine "bud-shoot" on a two-year-old lemon stock, which the wind snapped off at the union, leaving the stock a practical blank.

My previous budding operations had not been a great growth success, and this particular bud eclipsed all previous efforts, being fully three inches higher than the best, and I felt like a child that saw its doll fall into a running stream—I wanted to recover what I had lost. I could not "stick it on" again to the same stock, but—lucky thought—I could cut it up into buds, and recover it that way! I did so; recorded them from force of habit, and thought nothing more than that if they grew I should have saved a very promising tree.

The result that followed the use of these buds surprised me, because all that "took," outgrew with their first growth those that had not been blown off by the wind. They were thicker, rounder, taller, more glossy and robust than any of the others, seemingly more like what one might expect such a pretty scion to produce! In thinking it over, it seemed to be attributable to the large "tortoise-backed" buds I had stuffed into the slits made in the bark, which, as it were, supplied the foundations for the bud to start on. Anyhow, I decided as soon as the wood so produced should harden sufficiently to cut it off. I would try it again to see what happened.

This I did, and once more I got an equal surprise, for the last budded lot outgrew all the others, one of them putting up a fourteen-inch high bud with six leaves, four leaves being as large as one's spread-out hand, in the short space of twenty-one days from inserting the bud. This, now called (training) "third union," gave tremendous growth with beautifully rounded wood, handsome leaves, upright habit, ripening up well and strong when resting. I decided to try it for the *fourth* time, but the result was no different to the *third*, and as I did not know to what it would lead, I confined myself to second and a few thirds, until actual fruit should demonstrate the result. In 1899, I potted off into paraffin tins about 1,500 to 2,000 various firsts, seconds and thirds on the lemon stock, and having no ground ready, they had a long wait in these tins. Many of them were sold, principally first and second unions, and some two or three hundred were planted out in an experimental orchard, where the results could be seen and studied as often as I wished. It was some years later before I was in a position to form a definite opinion as to what "union" grafting had accomplished. This experimental orchard was a "dry" orchard, that is, an orchard not irrigated. It had been deeply ploughed several times from nine to twelve inches deep, was in good order, well kept, and the tilth little short of perfection, the machines used being the most up-to-date in the Colony. Every rain or shower that fell was systematically treated as if it was to be the last; thus, whatever moisture there was in the orchard was from rain, and could not be attributable to contaminating influences of impure irrigation water. The great test for health or vitality in a citrus tree is *drought*. Drought is the invariable indicator and exposer of weaknesses in any shape or form, root and branch, inheritance or disease; thus the third unions and many of the second unions, during the greatest droughts the district of Bathurst has ever experienced, continued to flourish under this dry cultivation, whereas the first unions, those that did not actually die, looked perfect wrecks, and often quite naked. The rains following upon these droughts never seemed to be able to re-establish the first unions, whilst the "thirds" would shew new growth almost immediately. The winds, too, while stripping the "firsts," did not affect the "thirds" to nearly the same extent, and the recovery of the former was always slow. Another peculiarity in their younger stages was that the orange butterfly selected only first unions to lay eggs upon, seemingly knowing they were the weaker trees.

The soft brown scale, with which I kept five trees constantly infested for three years to test the value of the white moth parasite, did not take kindly to any third union tree, but the four "second unions" and one "first" had to be ultimately sprayed, parasites and scale, to keep the trees from dying outright.

The differences in *fruiting* between first, second and third unions were so very marked, and so distinctly originated by the use of the lemon stock, that they must condemn the use of the lemon as an all-round training stock in the orchards of the future.

First Union Results.

The fruit of the first unions did not reach the recognised colour denoting "ripeness" until some weeks after the tree from which the scion had been taken had *already ripened its fruit.*

(It should be remarked here that the ripeness of citrus fruit is determined by its appearance at first sight. A person does not open a fruit to see if it is ripe, because he knows, as well as those who would purchase it, that the green colour of a fruit denotes unripeness. If, however, he has a seedling orange that ripens in April, and by grafting or budding it on to a lemon stock it does not ripen till May, he may not associate such peculiarity with the stock, unless he previously knows that the lemon stock imparts a greenish tone to the fruit, and thus delays ripening. Moreover, the additional time such fruit is given to hang to "colour up," allows the fruit the very opportunity it needs to sweeten itself. Thus, the influence of the lemon stock in a simple "first union" is often entirely overlooked, or is attributed to a later variety.)

The fruit of these first-union-to-the-lemon trees, whether oranges, mandarins or tangerines, was small-sized with dwarfish growth, but otherwise sweet and juicy.

The "lemon flavour" would not be detected by 95 per cent. of the world's orange-eaters, but none the less, the flavour was there.

The small size of the fruit would be against a first union of any kind, but not so much in point of flavour if, in the case of the lemon, it was planted in a low-lying, sandy or calcareous valley with plenty of heat and but little moisture at the ripening period. In such places first union lemons carrying mandarins or tangerines would do better than on any other stock known to the writer at a simple first union.*

Second Union Fruit.

The fruit, as well as the growth and carrying capacity of the tree, and the influence of the lemon stock, was practically twice one equals two: a two-fold influence from every aspect. They did not come into bearing until the second year after the "first unions" had carried their first crop, but the growth was nearly doubled, the fruit much larger, more numerous, the flavour quite acidulated and watery, perhaps not so much sprightly acid as "flat;" however, as the behaviour of second unions belongs to an exact halfway stage between first and third unions, it is superfluous further to describe it, seeing the difference between first unions and third unions, adequately represents the middle stage of second unions.

---

* The Mazoe or Rough Lemon which grows wild in the Mazoe Bush near Salisbury, Rhodesia, has been propagated and planted out in the same valley, from seed produced by these wildlings. The whole of the pedigree scions grafted on to them are dwarfed, and produce small fruit, except where scions have been obtained from trees already growing on the lemon stock notably the old Cape Orange. The flavour is good, because the dry season commencing in April gives the necessary opportunity for sweetening. The dwarfish habit of these trees is thus shewn not to be due to soil factors, but to the fact of first-union grafting failing to create sufficient affinity to promote growth.

Third Union Fruit, etc.

Before more fully detailing this, it should be understood that the new wood used by me for budding when I saw the growth that followed the "turning to account" of my accident played a not unimportant part in forming the juices of the fruit which so powerfully exposes the unsuitability of the lemon as a "training" stock.

If stock-influence is the inconsequent thing it is generally supposed to be, then those who refuse to believe in it must account for it in their own way. If they say it was not the new wood, they must perforce admit the potency of stock-influence or stock-factors.

My object is to prove it, as well as to shew the forces making for or against it. To describe third union fruit in actual detail is somewhat difficult, seeing many of them, that is, the new wood budded ones, have as yet not borne one fruit, notwithstanding several dry spells, which theoretically ought to have induced blossoming, but (with some of the others) a few fruits to a man with experience knowing the usual podgy class of fruit produced by young trees, enables him to form a fairly correct opinion, and to pronounce upon what the mature crop will be like, as judged by the standard of the fruits that shewed themselves last season, as well as a few less the preceding season.

Taking mandarins or tangerines first, many of them carried from fifty to one hundred and fifty fruits per tree, and are, therefore, quite large enough to enable me to say what the ultimate yield of fruit will result in.

Our common, broad-leaved naartje, seemingly very similar to the Oneco mandarin orange, described by Hume in his book "Citrus Fruits and their Culture," page 108, grew luxuriantly, forming the prettiest trees for their age I had ever seen. The fruit was produced in clusters, five to seven in a cluster, each fruit being ten to eleven inches round, whilst single fruits or sprays of two and three, would *exceed* eleven inches in circumference.

After having witnessed the results of "second union" grafting on the lemon I naturally expected *third* union would be fully as bad or worse, but that it should be so conspicuously bad, and entail such a financial loss I could not possibly anticipate.

The "second union" previously mentioned did not ripen till June, therefore, it may not come as a surprise to say that the third unions were still green in July, still green in August, in September, in October, and in November.

They commenced to colour in December (mid-summer) and in January, when I threw them away, although they were still not properly coloured ripe, although they were hollow shells, absolutely devoid of one single drop of juice. The frame-work of the flesh was intact, but a dry sponge.

In July, they were disgustingly tasteless, and so on, up till December, when the "disgustingly tasteless" juice began to dry up. The "best" (?) flavour was in November, when they resembled a very fibrous turnip with a decided *orange smell.*

The season here mentioned (1905) was a good season, and the inference is plain that good rains develop stock influence enormously, but whereas in the case of the lemon stock it produced absolutely unsaleable fruit, with the orange stock and with seedlings it produced excellent fruit, both as regards size, as well as flavour.

The next season (1906) was a very dry one, and stock-influence being less developed or active, the trees produced fruit that, whilst being leathery and insipid, was yet sweet and marketable, as we view fruits in these parts. The yield per tree was about the same, the fruit about one-fifth smaller, but so far only three more young wood trees bore any fruits at all, which fruits were very small and practically inedible from their fibrous or woody character.

Many of the Washington Navels in 1906 were juicy and pleasantly sweet. The sweetest ones borne by those trees whose leaves were curled up and nearly whitened from drought, and the sweetest of these again were those fruits that ripened first, whereas last year they all refused to colour until picked and cured in the same way as a lemon, the flavour being distinct lemon, not an orange in any way, and quite unmarketable.

Seven naartjes, locally called Cinnamon Oranges (a very close relation to the Spice Tangerine, I fancy), stock-crossed from Seville to lemon, to lemon again, all bore heavily (last year as well as this), and the fruit, whilst being pleasantly acid and nearly twice the ordinary size, could be sold without disgracing the grower or the lemon stock! The reason for this will be found under "crossing."

The Valentia late—second unions only—although bearing shyly and of poor flavour in 1905, ripened up at the proper time (August), in defiance of the influence of rain and the lemon stock. The reason for this will be apparent if my chapter on "Mongrels" is studied, although it is quite impossible for me to explain otherwise than by theory. The scions for these were from two sources, and no records kept of either. One lot was obtained from young nursery trees on principally Seville, or Seville and pamplemous stocks, and the other batch of scions were cut from two four-year-old weakling pamplemous stock. The theory I form is this, that the combination of elements contracted by the trees growing on the Seville or pamplemous stock, preceded by other dissimilar stock or not I cannot say, would, when budded or grafted on to the lemon for the first time, throw off one element or influence by such union; and when grafted again from such growth as a second union to the lemon, throw off another *without actually associating itself with the true* lemon, or stock influence, until a further union had practically resulted in *one true* first union. It seems difficult to account for it in any other way, but by the dissipation of one mongrel influence and the introduction of another by its growing stock.

The use of the common (Mazoe) lemon as a stock over and above what has been outlined here, seems to warrant the belief that it will make a fairly successful first union with any fruit having a similar baggy rind to that possessed by its own rind or fruit.

It seems also possible to state with the certainty of constant results that an acidulating stock like the lemon has not the same power to acidify its grafted fruit, when growing in a sand. This feature has been remarked by many growers, and may be said to be negatively proved by the positive point that an orange will produce its best fruit in a loam, and the least aroma or flavour in a poor or moist sand: thus the less active form of soil favours the lemon, and the most active the orange, that is, of course, when both stocks are used to grow oranges. Oranges grown in a sand, not fed by higher land, or by river detritus, may be sweet and juicy, but still lacking in those finer essentials of aroma and flavour which distinguish the high-grade orange.

In concluding this chapter it will be seen that starting free from mongrel-influence, it is impossible to use the lemon as a "training" stock for anything but *lemons*.

Its influence as a stock is too pronounced to allow training to be carried onward, except for naartjes, and only in sandy soils, propagated by grafting; moreover, it seems highly probable that "first unions" will weaken the vitality of the stock.

Whatever merit the lemon possesses as a stock over and above the fact that the orange is sold with its seeds for money, whilst the seeds of the lemon are obtained for practically nothing, must rest upon the growth it makes at first union, together with the advantage or disadvantage, as the case may be, which it offers as a possible stock for delaying the ripening period of any given fruit, and so creating a somewhat later variety.

The lemon is not condemned by me without a full and exhaustive trial, and seeing I have some two thousand trees on the lemon stock, representing some seven years' work, and in all classes of soil, it comes hard to say the bulk are failures so far as a good market is concerned.

Prospective fruit-growers must think for themselves, and if they ask the advice of any man they must ask themselves at the same time the question: Does this know what an orange ought to be, seeing he recommends the lemon stock? Whom am I to believe? How can I reconcile the two conflicting statements?

To guide the reader further at this stage. I will add a word in explanation.

The nurserymen in this country advocate the use of the lemon stock, and I do them the justice to say that they conscientiously believe it to be the *best* stock; in fact, I thought so myself until I understood what "specialisation" meant, and saw its results. The nurserymen have tried every known stock, but omitted the consideration of the aspect of soils and moisture, thus they find that the lemon is the only stock in the citrus family that will give the best growth at first union in dry or open ground.

At the same time I affirm it is the worst stock wherewith to produce fruit and flavour. The commonest, lowest type of Cape seedling orange surpasses it in every way. I have many "first unions" lemons bearing small but good quality oranges that will never produce a standard crop of fruit, and the fruit will always be permeated with the "lemon" flavour in good seasons. Those who do not know what a high-class "Cape seedling orange" tastes like when fully ripe can have no objection to the "lemony" flavour, because they have no standard fruit to compare the flavours one with the other.

Beyond the mere question of fruit I would ask those who intend using the common lemon as a "stock" in what respect they think they will be benefited thereby? What do you want with a *stock?*

What is a "stock" going to do for you that a seedling orange of good quality will not do better? Why do you, as a prospective orange-grower, fall into the common error of imagining a stock to be an indispensable condition, when it will only produce inferior growth and poor fruit at first union?

Think the matter over quietly, and put into actual words what you hope to gain by the use of a stock, more particularly the *lemon* stock!

Do not, however, confuse the lemon stock with the term "sour stock." This phrase, according to Americans, as well as Australians, has different meanings in different places, and possibly means nothing distinctive or certain to anyone outside the locality where the term is used as a provincial phrase. In many places "sour stock" means the Seville or Bigarade orange, and I venture to assert that the sooner citrus nomenclature becomes re-modelled and made capable of conveying a universal meaning to all interested, the sooner *order* will replace existing confusion.

As a postscript to this chapter, it should be mentioned that the various phases of citrus culture herein expressed should be carefully studied *as a portion of the whole book*, rather than that any portion of this chapter should be singled out and quoted as a definite finality by itself, which is not intended.

(*To be continued.*)

THE FERTILITY OF SOME COLONIAL SOILS, AS INFLUENCED BY GEOLOGICAL CONDITIONS.

(BY CHAS. F. JURITZ. M.A., F.I.C., Senior Government Analyst.)

Read at a meeting of the S.A. Philosophical Society, held on the 27th March, 1907.

About seven years ago it was my privilege to read before this Society a paper embodying some results of investigations made in the Government Analytical Laboratory with regard to the proportions of plant food in a number of soils collected within the South-Western Districts of the Colony.* I then endeavoured, as far as available information would permit, to refer each sample analysed to the underlying geological formation, with a view to deducing such conclusions, as it would be permissible to draw, respecting certain phases of the agricultural capabilities of soils derived from this or that series of rocks. It was at that time found practically impossible to suggest any deductions in respect to the relationship between the geology of a district and the agricultural potentialities of its soils, based upon the results of chemical analyses of the latter, which could not have been equally well arrived at by comparing the geological features with nothing more than the practical experience of local agriculturists. Family resemblances between soils overlying one and the same series of rocks were not sufficiently evident, and, as far as the investigations in the Government Laboratory had proceeded, similarities between soils were apparently due more to geographical than to geological causes.

The reasons for this will become clearer as we proceed, but for the present they may be summarised in two words: insufficient data.

It is an essential preliminary to an adequate comprehension of the figures which I propose to place before you that I should explain precisely what is meant by the term "soil analysis" as employed and implied in this paper. The expression has a variety of significations; hence it is not surprising to find that it has been subjcted to much misuse, as the operations it represents have been to much abuse. We are gravely told—generally by persons who are neither chemists, nor have kept abreast of the times in scientific agriculture—that soil analysis has not the value for the farmer once attributed to it. But there is a flaw in the reasoning, owing to want of definition: logicians call it the fallacy of the ambiguous middle term. We may put the syllogism in another way, and you will then perceive the flaw at once: *Some* modes of soil analysis are valueless for agricultural purposes; the determination of the proportion of plant food in the soil is *one* mode of soil analysis; hence the determination of the proportion of plant food in the soil is valueless for agricultural purposes. Here the substantial correctness of both major and minor premises may be conceded, but the conclusion is false; it is the fallacy of a universal conclusion from a particular premise. It is by people who reason in this manner that chemists who perform and Governments who permit extensive investigations into the nature of the country's soils for the benefit of the agriculturist, are held up to fine scorn for squandering the taxpayer's money in vain research.

---

*Trans. S.A. Phil. Soc., vol. xi., Pt. 2, pp. 125-160.

There is, however, an opposite extreme. This, like the last, is common to the learned and the unlearned. Many imagine that the chemical analysis of a thimbleful of soil will terminate all agricultural perplexities for the farmer. Both extremes are erroneous, and for one reason: the exact nature and scope of agricultural chemical analyses of soils are not properly understood.

It is a generally accepted fact that certain chemical compounds are necessary to the normal growth and development of plants. Most prominent amongst these compounds are lime, potash and phosphoric oxide. These three comprise the inorganic or mineral constituents of the food of plants; there are other constituents as well, but it is not material to refer to these here. The three compounds just named are therefore termed "plant food constituents." It is essential and important to note the distinction between "plant food constituents" and "plant food." Potash, for instance, is a plant food *constituent*, no matter where or how it may exist, whether deep down in the mines of Stassfurt, or in the wool on the sheep's back, in the impermeable granite below Table Mountain, or in the waters of the Dead Sea; but it is not plant *food* except when present in the soil—more than that—except when present there in the very condition in which the plant growing upon that soil can withdraw it and turn it to its own account.

Now a chemical analysis of the soil, to be of value to the farming community, should tell, not the quantities of plant food *constituents* present, but the proportion of plant *food*. It becomes obvious then that we are to distinguish between at least two kinds of chemical analyses of soil, one of which supplies the farmer with information of value, while the other does not; the latter may, nevertheless, be of considerable value to the geologist. Those who assail soil analysis generally confuse between these two kinds, and rain their blows upon both without discrimination. As a matter of fact, it would be more correct to divide soil analyses into three classes. First of all the plant food constituents may be present in the soil in such a condition as to be quite incapable of being absorbed by the plant; bearing in mind that we are looking at the subject from the agriculturist's standpoint, we may call these the plant food constituents of the third or lowest grade. The chemist who wishes to ascertain the *total* quantity of plant food constituents in the soil needs to employ the strongest chemicals, or the energetic action of fluxes at a high temperature in order to attain his object, for the plant food constituents of the third grade are usually silicates or aluminates, and do not respond to any less radical treatment; in any case, they are not plant *food.* Needless to say, that the acids generally employed by the agricultural chemist fail to extract these compounds from the soil, and hence do not give the utterly misleading results occasionally attributed to them. The first and second grades of plant food constituents differ from the third in being available for plants: that is to say, they are actually plant food. These are extractible from the soil by mineral acids, such as hydrochloric acid. The plant food constituents of the first grade are readily, or immediately available to plants, and the chemist can extract them from the soil by means of water or weak organic acids, such as a dilute solution of citric acid; those of the second grade are less soluble, less readily available to plants, and extracted in the laboratory by strong mineral acids, but not by water or weak organic acids. They are not immediately removed by the crops, but continue in the soil as a "reserve stock"—a term that I shall have occasion to use again; let it be remembered, therefore, that, whenever it is employed in the course of these remarks it signifies plant food of the second grade.

Thus we have these three grades of plant food constituents in the soil:—

I.—Soluble in water and in weak organic acids:
Immediately or readily available for plants.
II.—Soluble in strong mineral acids:
Available for plants only as a reserve stock.
III.—Insoluble in ordinary acids, and extracted only by fusion or by specially powerful reagents like hydrofluoric acid.
Not available for plants.

Obviously the agriculturist has little, if any, interest in non-available plant food constituents, and chemical analyses—be they of a single soil sample, or of a whole series of representative soils from various parts of the country—which give only figures shewing the total amounts of plant food constituents present, and afford no indication as to the quantity of available plant food—whatever interest they may possess for the geologist—have none for the farmer. It is true that by mechanical disintegration and chemical decomposition plant food constituents of the third grade may ultimately become available, as they very slowly change into those of the second, but the process is so gradual as practically never to have any value for the generation in occupancy. The constituents of grades I. and II., on the contrary, possess great interest for the farmer; they comprise the actual plant food; the former affect the land's immediate productiveness, the latter its permanent value.

So we are brought to this conclusion, that, if a chemical investigation of a country's soils is to be made, it is the reserve stock of plant food in the soil (that is to say, the constituents of the second grade) that calls for first attention. They are constantly changing into constituents of the first grade, and are being removed from the soil by plants very much more rapidly than they can be produced from the constituents of the third grade. It may be of some value, either incidentally, in certain cases, or subsequently to a thorough investigation of the reserve stock of plant food in the soils of the whole country, to enquire into the conditions and quantities of the other two grades as well, but the immediate and pressing necessity is to proceed with all speed along the line just indicated as demanding prime consideration.

We must not dwell on these points too long, especially as I hope to revert to them again in a pamphlet now in course of preparation, which will deal more fully with the details of the soil investigations that have been carried out up to the present in the Government Analytical Laboratory, but, before passing on, it should be said that one reason why fuller data were not to hand at the time of the preparation of my last paper on this subject was that a sufficient number of soils had not then been analysed by a method which could be taken as affording a reliable means of ascertaining the reserve stock of plant food in the soil, and it is, of course, inadmissible to compare, say, a granitic soil examined by one mode of analysis, with a sandstone soil treated in another way. Even now the data are all too few, but the need of arousing, in scientific circles, a deeper interest in investigations of this kind, and, amongst the general public and the farming community more particularly, a keener sense of their importance and value is most pronounced; hence my reason for laying before you figures which might otherwise have been well deferred until they had attained to greater completeness.

In all the analytical results which follow, the method of analysis adopted has been the extraction of the soil at the ordinary temperature with hydrochloric acid of 1.115 specific gravity for five days, and the determination of inorganic constituents in the solution so obtained. This method was very fully detailed in my previous paper, and I still regard it as, of all extraction methods the most satisfactory for quantitatively gauging the reserve stock of plant food in soils.

Although the figures arrived at by this method from various soils of similar type are in very close agreement amongst themselves, it must not be supposed that the reserve stock of plant food is a sharply defined item in any soil—one that can be determined with the rigid accuracy generally associated with chemical operations. It must be clearly understood that the methods of determining plant food in soils have an element of arbitrariness about them which causes the results obtained by their means to be more or less empirical. At the same time it must never be forgotten that all this can be true without in the least detracting from the great value of the information thus gained.

Just here one or two figures may be given to indicate how plant food constituents in different degrees of availability are to be found in one and the same soil. The following, taken from Bulletin No. 41 of the Minnesota Agricultural Experiment Station shews that a very considerable proportion of the plant food constituents present may be in forms not available for plants.

	Lime.	Potash.	Phosphoric oxide.
Wheat Soil.—			
Grade II.	2.44	.54	.38
Grade III.	.36	2.18	—
Heavy Clay Soil.—			
Grade II.	.48	.21	.12
Grade III.	.16	3.46	.08
Grass and Grain Soil.—			
Grade II.	.51	.30	.23
Grade III.	.35	1.45	.05

It will be noticed that in the clay soil as much as 96 per cent. of the total potash is in a form unavailable for plants.

Similar results have been arrived at in our own laboratory; for instance, three soils from farms in the George Division (Uitkijk and Great Brak River) were extracted by the hydrochloric acid method already referred to. Thus the following percentages of plant food (Grade II.) were obtained:—

	Lime.	Potash.	Phosphoric oxide.
A	.050	.023	.012
B	.094	.061	.015
C	.044	.017	.008

On evaporating soils taken from the same localities with a mixture of hydrochloric and nitric acids, and thereafter boiling the residues with hydrochloric acid, very much higher results were arrived at:—

	Lime.	Potash.	Phosphoric oxide.
A	.25	.14	.11
B	.19	.25	.029
C	.25	.27	.055

A clear indication that these soils, which were granitic in origin, contained a considerable quantity of plant food constituents of the third grade.

In analysing a soil with the object of determining its "reserve stock," (*i.e.*, Grade II.) of plant food, a clear description of the method of extraction is always essential. The standard method adopted by Professor Hilgard and other American investigators, indicates the *maximum* amount of plant food that is present in any given soil in a condition capable of extraction by plants; this is one reason for the adoption of the method.* A somewhat similar statement may be made in respect of the "immediately available" (Grade I.) plant food in the soil. The results obtained, for instance, by Dr. Dyer's citric acid method, may be looked upon as indicating, not the reserve stock, but the immediately available plant food; and as shewing the maximum amount immediately available, in much the same way as hydrochloric acid of 1.115 specific gravity shews the maximum that can be considered to be present as a reserve stock. Extraction of a soil with water likewise shews immediately available plant food therein, although not the full amount. How much less may be extracted from a soil by one method than by another will be gathered from the following results obtained in regard to a soil collected on the Government agricultural farm "Elsenburg," in the Stellenbosch Division:—

	Potash.	Phosphoric oxide.
Grade 1.—Extracted with water . .	undetermined.	.0013
Grade I.—Extracted by Dyer's Method (citric acid)	.017	.0036
Grade II.—Extracted by standard method	.024	.024

Of course it will be seen that, as everything that water or the weaker organic acids could extract from a soil will also be removed by hydrochloric acid of the standard strength, the second grade of plant food will generally include the first; in other words if Grade I. is taken to mean "immediately available" plant food, then Grade II. means "immediately available" plant food plus "reserve stock."

---

* The method adopted as a standard in the Government Laboratories here differs from Professor Hilgard's only in being carried out at the ordinary temperature, whereas his is conducted at steam temperature. In this respect our method is more along the line of that employed by the German Experiment Stations.

This being the case, it follows that when water or citric acid extract only infinitesimal quantities of plant food from the soil, there may still be a large stock of plant food in reserve, but if only small amounts are extracted by hydrochloric acid, there cannot be much plant food of any kind. If, therefore, the hydrochloric acid extraction method indicates the soils of a certain area to be poor, there can be no question that they are poor indeed.

I pass on, from these more or less introductory remarks, to another aspect of the subject under consideration. At the time of my former paper the work of the Geological Commission had not advanced to the stage it has now attained, and the results of that work were not available, as they are at present, for the purposes of our own investigation. The geological survey of the Colony cannot but be of great worth to the scientific agriculturist, the more so when supplemented by investigations such as those with which the Government Analysts have been engaged; in fact, it is not too much to say that, in great part, they only become thus fully available when so supplemented. The detailed and instructive maps issued by the Geological Commission, shewing, in very many cases, the boundaries of the farms surveyed, cover largely the ground traversed by the chemical staff, and are comparable with the maps issued by my own office, in connection with which the endeavour has ever been to mark, as accurately as possible, the farm boundaries and all localities whence samples of soil have been collected. Hence the soils analysed can often be assigned to their proper geological formations, and deductions drawn accordingly. Facilities were thus afforded whereby it became possible to arrange the figures in the subjoined tables in classified lists.

Before any further reference is made to these figures the extreme difficulty of obtaining samples of soils typical of definite geological formations must be mentioned. It does not need much discernment to classify as a sandstone soil one taken from the top of Table Mountain, or as a Malmesbury slate soil one from the upper slopes of Lion's Rump. But when a valley composed of beds of the Bokkeveld series is flanked by sandstone mountains, it becomes less easy to predicate to what extent each has influenced the chemical nature of the soil; still more complicated is the problem when dealing with such districts as Robertson, where, in parts, quite a large number of rocks contribute to the formation of the soil.

Had the samples of soils examined been so selected as specially to typify certain definite geological series, it is highly probable that ere now much more would have been learnt regarding the nature—from the farmer's standpoint—of the soils derived from each series; but circumstances have all along rendered any such system of collection impracticable: indeed, as observed on a former occasion, geographical rather than geological considerations had to guide us in the selection of areas to be investigated.

In spite of the fact that conditions were not propitious for the selection of typical samples, it has been possible to sort out from the many soils that have been analysed, some to typify various geological formations, and the chemical composition of the soils so sorted out on the whole bear out the reasonableness of the classification.

I propose, first of all, to consider the soils derived from the geologically oldest rocks, and to follow the upward sequence thence, as circumstances permit, ending with the superficial deposits.

Beginning, then, with the pre-Cape rocks, as the Geological Commission has termed them, which underlie the Table Mountain and correlated series, the soils derived from the Malmesbury series require first notice. I regret that by the standard method adopted in our laboratory no analyses have been made of sufficiently typical soils collected within the district which gives its name to this series, but from the Malmesbury beds of the Paarl and Stellenbosch Divisions the fourteen soils enumerated below were taken, in such places as to be practically representative. The series of rocks from which these are derived consists mostly of hard, close clay slates; the chemical composition of the latter is, for the most part, silicate of alumina, and, therefore, practically void, not only of plant food, but also of plant food constituents.

The percentage proportions of lime, potash, and phosphoric oxide in the soils are what I chiefly desire to direct attention to, but there are also incorporated in the list the percentages of moisture retained in the air-dried soils, as well as the organic matter lost on ignition; these latter are expressed in terms of the soil sifted through a 1 millimetre sieve, while the determinations of plant food are calculated upon the fine earth, a term which is herein taken to mean that portion of the soil capable of passing through a sieve with meshes half a millimetre in diameter. The percentages of this fine earth in the sample as collected in the field and air dried are also given below.

I.—MALMESBURY SERIES.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
1	Paarl	Matjes Kuil	51.0	.29	1.29	.024	.010	.017
2	„	Groenfontein ..	81.2	.67	2.65	.012	.029	.027
3	„	Kuilenberg	53.6	1.13	5.23	.072	.045	.061
4	„	„ ..	55.1	1.72	6.41	.100	.073	.055
5	„	Lange Rug	65.3	1.11	5.22	.034	.041	.046
6	„	Knolle Vallei.. ..	79.6	1.72	7.39	.098	.044	.056
7	„	„	68.7	.32	1.77	.012	.013	.010
8	„	Driefontein	50.6	.52	1.23	.022	.048	.019
9	„	Burger's Drift ..	60.3	1.20	4.07	.026	.075	.054
10	„	Drijvers Vallei ..	51.8	1.48	4.87	.014	.039	.055
11	„	Lang Hoogte	55.8	.63	2.33	.010	.042	.027
12	Stellenbosch .	Elsenburg..	80.2	.95	2.07	.065	.024	.024
13	„ ..	Elsenburg..	57.7	.63	2.25	.044	.024	[illegible]
14	„ ..	Nooitgedacht.. ..	92.2	.81	4.26	.008	.039	[illegible]

Nos. 3 and 4 are posible affected by disintegrated granite, but very little chemical change would be noticed in consequence hereof, for a reason that will be alluded to later. These clay slate soils, it will be noticed, exhibit, almost uniformly, an all-round poverty in plant food. The percentages in the above fourteen soils average as follows:—

Lime	.039
Potash	.039
Phosphoric oxide	.039

Commencing near the village of Robertson, a tongue of the Malmesbury beds runs at first westward for about thirty miles, and afterwards northward, between two sandstone ranges, for a distance of nearly forty miles, forming the Tulbagh valley. As will be more readily understood later on, when we come to deal with the soils of the Table Mountain series, the soils of the northern portion of this valley, being practically encircled by mountains composed of Table Mountain sandstone, are distinctly poor all round. It would, in fact, be difficult to understand, as we shall afterwards see, whence they could derive any natural fertility; the root of the tongue, nearer Worcester, is less dominated by the sandstone, and the calcareous matrix of the Enon conglomerate, which prevails there, exercises an undoubtedly advantageous effect upon the soil. The following are the analyses of the soils collected from this strip, beginning with the sandstone encircled tip and working downwards:—

II.—TONGUE OF MALMESBURY SERIES EXTENDING FROM THE VICINITY OF ROBERTSON TO THE WINTERHOEK MOUNTAIN NORTH OF TULBAGH.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
15	Tulbagh.. ..	Misgund	73.4	.95	3.51	.044	.032	.023
16	„	Knolle Vallei.. ..	61.4	1.49	3.64	.068	.038	.047
17	„	„	98.7	5.75	10.09	.008	.030	.023
18	„	Kluitjes Kraal ..	94.8	2.92	11.78	.070	.095	.070
19	Worcester ..	Breede Rivier.. ..	83.4	1.34	3.77	.086	.027	.034
20	„ ..	Wilge Rivier.. ..	53.7	2.19	7.55	.150	.147	.093
21	„ ..	Eendracht..	100	2.09	6.62	.066	.037	.069
22	„ ..	Hartebeest Rivier	70.9	.79	3.47	.016	.091	.051
23	„ ..	Zeekoegat..	89.6	1.59	4.04	.200	.195	.089
24	„ ..	Tweefontein	70.0	.78	2.98	.038	.158	.078
25	„ ..	Nonna..	75.5	1.45	3.64	.156	.008	.063

In many places the soils resulting from the rocks of the Malmesbury series are diversified by the intrusion of granite. The consequent diversity is more than becomes evident at first sight, for, although poverty in plant food is practically inherent in the soils of the Malmesbury series, it is otherwise with those derived from granite. This is owing to the fact that while the Malmesbury rocks are deficient in plant food constituents, the intrusive granite is not, and thus the resulting granitic soils impart to the clay slate soils not only plant food constituents, proportionate to the relative quantities in which the two classes of soil are mixed, but also actual plant food, proportionate to the amount of decomposition that the granite has undergone. Where the granite has not been sufficiently decomposed, the elements of fertility contained in its constituent minerals are not available for the plant. In other words, sufficiency of plant food *constituents* may then be present in the soil while there is lack of plant *food*. The diversification of the clays derived from the Malmesbury slates, consequent upon the introduction of granite as a soil-forming factor, is therefore dependent not only on the relative quantities wherein these two classes of rock contribute to the formation of any particular soil, but also on the stage which the mechanical disintegration and chemical decomposition of the granite has reached.

These facts naturally add to the difficulty of laying down anything like a typical composition even for unmixed granitic soils. It may be remembered that, in the course of my previous paper on this subject, mention was made of several granite soils that had been analysed by Professor Hahn. In one—an alluvial soil—the constituent minerals of the granite had completely decomposed, and the results of the analysis of this soil were:—

Lime	.281
Potash	.151
Phosphoric oxide	.172

The averages of the others, which were primary granitic soils, twenty in number, were:—

Lime	.037
Potash	.025
Phosphoric oxide	.014

It was not, I repeat, that the latter contained less lime, potash and phosphoric oxide than the former, but that those substances were largely present in the first soil in the condition which I have described as Grade II., whereas in the others the greater part existed as plant food constituents of the third grade. With this explanation there should be no cause for surprise that most of the nine primary granite soils whose analyses follow are shewn as deficient in mineral plant food.

III.—GRANITE SOILS.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
26	George	Diepkloof..	94.7	.97	3.51	.028	.034	.020
27	Malmesbury .	Alexanderfontein.	72.0	1.57	5.83	.146	.121	.061
28	„ ..	„ ..	73.8	1.15	3.18	.072	.075	.072
29	„ ..	„ ..	80.0	1.47	5.01	.096	.095	.073
30	„ ..	„ ..	72.2	1.01	4.33	.014	.114	.049
31	„ ..	„ ..	68.0	1.09	2.64	.014	.045	.028
32	„ ..	„ ..	76.0	1.28	4.30	.014	.095	.055
33	Paarl	Vredehof	61.5	.87	3.69	.034	.014	.055
34	Stellenbosch .	Neethlingshof ..	69.1	1.26	4.05	.024	.023	.018

The averages of these soils work out as follows:—

Lime	.049
Potash	.069
Phosphoric oxide	.048

The result of the partial decomposition of the felspar contained in the granite is seen in the relatively larger percentage of potash when these analyses are compared with those of the clay slate soils.

Above the slates of the Malmesbury series, in the Oudtshoorn Division, are what have been termed the Cango beds, consisting of quartzitic pebbles embedded in a slaty matrix, which at some places becomes calcareous. It may be expected that the former type will produce a comparatively poor soil, while a correspondingly better class of soil will be produced where the calcareous matrix prevails. Unfortunately the sandstone range of the Zwartbergs so overshadows the localities whence were collected the only three of our samples which represent the area of the Cango beds that the exact extent to which they typify these beds cannot yet be gauged. The following are the three soils referred to:—

IV.—CANGO BEDS.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
35	Oudtshoorn	Lemrick	58.6	1.11	3.68	.068	.194	.123
36	„	Welgevonden	76.0	1.90	5.10	.084	.144	.067
37	„	Matjes Rivier	61.6	3.15	17.14	7.460	.087	.166

Nothing need be said to emphasise the great difference between the first two and the last of these three soils.

We have now to turn our attention to a class of soils of still more pronounced calcareous type. As in the south-western corner of the Colony the pre-Cape rocks comprise largely the Malmesbury clay-slates and shales, so in the northern part we have the series of rocks which, over thirty years ago, Stow associated with the name of the Campbell Rand—that range of precipitous cliffs which terminate the Great Kaap Plateau towards the south-east, and flank at first the Vaal and subsequently the Harts River for a distance of over a hundred miles from the junction of the former with the Orange River below Campbell. Limestone and dolomite enter largely into the formation of these rocks, and extend westward and northward as far as Vryburg.

In the soils representative of this series we must consequently expect to find large quantities of lime. Here and there, however, the quartzites and sandstones of the superimposed Griquatown series become apparent, and considerably diminish the proportions of available lime.

The following table shews the results of analyses of these soils:—

V.—CAMPBELL RAND SOILS.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
38	Kuruman ..	Kuruman..	76.4	1.01	1.48	.026	.024	.024
39	" ..	"	100	13.56	38.22	3.66	.030	.132
40	" ..	"	88.7	2.89	7.54	4.80	.084	.088
41	" ..	"	85.2	3.54	4.99	6.32	.059	.056
42	" ..	"	94.7	4.16	6.75	14.04	.028	.059
43	" ..	"	87.1	1.86	2.13	.278	.068	.026
44	Vryburg ..	Geluk	89.6	.92	1.63	.062	.020	.013

Stow* distinguished between the rocks of this series and the olive shales, as he termed them, deposited unconformably over the ancient schistose rocks underlying the crystalline limestone of the Campbell Rand. The analyses given in the next table are those of soils which may be taken as representing this deposit of shales.

VI.—QUARTZITES AND SHALES EAST OF CAMPBELL RAND (STOW'S OLIVE SHALES.)

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
45	Hopetown ..	Vluitjes Kraal ..	90.0	.73	1.29	.048	.065	.020
46	Barkly West.	Brady's	92.2	.94	1.78	.044	.050	.031
47	" ..	"	84.4	1.16	2.80	.020	.112	.045
48	" ..	Patrys Kraal ..	83.4	2.02	2.98	.082	.056	.038
49	" ..	"	93.4	3.33	4.19	.240	.123	.031
50	" ..	Gaanzepan	97.3	.66	1.47	.020	.046	.013
51	" ..	"	94.6	.63	1.31	.036	.035	.014
52	" ..	H.V. 73	94.6	4.74	10.90	3.768	.187	.101
53	" ..	Zwartputs	98.3	.79	1.69	.020	.037	.022
54	" ..	"	96.8	2.02	2.98	.082	.056	.038
55	" ..	H.V. 67	96.6	6.82	5.64	1.037	.054	.195
56	" ..	H.V. 63	97.6	6.03	4.98	.461	.027	.154
57	Taungs	Salisbury	93.8	.54	1.17	.034	.034	.009
58	"	Luxmore	85.2	2.05	3.11	.220	.101	.063
59	"	Middle Park	95.4	2.56	3.38	.162	.103	.055
60	"	"	88.2	.51	1.31	.010	.030	.014
61	"	Mogogong	73.5	1.04	2.13	.022	.024	.045
62	"	"	82.5	2.47	3.91	.130	.118	.039
63	"	"	76.6	1.22	2.19	.008	.041	.045
64	"	"	80.9	1.78	2.47	.054	.074	.040
65	"	"	73.0	.84	1.71	.006	.039	.032

Although some of the soils enumerated in this last table are of good quality, nearly all of them shew a deficiency in potash and phosphoric oxide, while about a dozen lack lime as well. Their averages are as follows:—

Lime	.310
Potash	.067
Phosphoric oxide	.051

**Geol. Soc. Quarterly Journal,* Dec. 1874.

Of the rocks of the Cape system, the lowest are those of the Table Mountain series. Table Mountain sandstone constitutes the greater part of the lofty mountain ranges which extend for hundreds of miles along the south western part of the Colony; they tower above all other rocks for very many miles around, and it is, therefore, a safe assumption to make that the virgin soils, collected from these high altitudes, are quite uninfluenced by any other geological formations. Furthermore, the rocks of the Table Mountain series consist of little else than silica, namely, sandstones and quartzites, with occasional shales. It may be anticipated, therefore, that the soils thence derived will not be of very complex chemical composition, but will, on the contrary, lack the essential elements of plant food. This we actually find to be the case. The following is a table shewing the results of analyses of 46 soils collected either directly from areas formed of this sandstone, or from valleys so completely dominated by ranges of the Table Mountain series as to render it practically certain that no other geological formations could have contributed to their composition in any marked degree.

VII.—TABLE MOUNTAIN SANDSTONE SOILS.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
66	Bredasdorp	The Hope	90.6	1.75	5.35	.064	.017	.045
67	Caledon	Gloria	73.5	.47	1.77	.010	.017	.037
68	"	"	64.3	.86	2.92	.006	.008	.028
69	"	"	52.5	.34	1.26	.008	.008	.015
70	"	Geelbeks Vlei	81.6	.58	3.36	.044	.014	.009
71	"	Isaaks Rivier	—	1.01	—	.014	.09	.05
72	Ceres	Riet Vallei	97.0	.36	1.93	.072	.015	.022
73	"	"	80.7	.37	1.86	.010	.015	.028
74	"	"	98.3	.27	1.41	.010	.012	.010
75	"	"	98.0	.56	2.55	.008	.017	.032
76	George	Outspan Reserve	97.8	1.62	6.57	.034	.016	.022
77	"	Woodville	98.2	1.41	6.02	.024	.010	.015
78	,	Diep River	97.0	1.12	5.94	.026	.016	.031
79	"	Grootfontein	66.8	2.78	8.06	.040	.041	.095
80	"	Schoonberg	81.9	2.84	7.37	.030	.066	.068
81	Knysna	Geelhoutboom	96.0	1.17	6.55	.032	.012	.020
82	"	Roode Kraal	98.5	.86	4.19	.044	.011	.013
83	"	Balmoral	94.7	.97	5.01	.050	.014	.018
84	"	Millwood	96.6	1.59	8.86	.074	.017	.031
85	"	Portland Heights	95.6	3.84	12.21	.032	.028	.056
86	"	Portland	98.2	1.27	5.81	.028	.014	.046
87	"	Ashby	97.0	.66	2.80	.028	.023	.010
88	"	Holt Hill	98.0	1.20	5.39	.082	.030	.018
89	Oudtshoorn	Saffraan River	76.3	.40	1.89	.074	.035	.040
90	Paarl	Keerweder	77.9	2.16	7.57	.010	.039	.042
91	"	"	70.4	1.40	4.27	.042	.087	.042
92	"	La Dauphine	57.8	.81	2.55	.008	.013	.038
93	"	La terre de Luque	65.1	.97	2.78	.008	.013	.022
94	"	"	56.9	1.56	4.77	.006	.015	.017
95	,	Zand Drift	86.3	1.41	3.85	.058	.019	.038
96	Robertson	Concordia	66.4	.81	3.25	.030	.027	.036
97	"	"	62.4	.59	2.95	.013	.060	.045
98	"	Rietvallei	60.3	.21	1.21	.010	.036	.010

VII.—TABLE MOUNTAIN SANDSTONE SOILS.—*Continued.*

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
99	Swellendam .	Tradouws Hoek ..	76.8	.77	4.15	.024	.033	.023
100	Tulbagh ..	Doornboom	24.4	.27	1.61	.008	.020	.019
101	Uniondale ..	Gold Diggings ..	57.1	1.78	4.72	.054	.050	.077
102	„ ..	Avontuur	83.4	.71	2.92	.058	.030	.036
103	„ ..	Misgund	35.8	.76	3.30	.050	.062	.052
104	„ ..	Klipheuvel	94.2	.74	2.97	.030	.038	.026
105	„ ..	Krakeel River ..	92.4	1.07	3.20	.040	.054	.044
106	Worcester ..	Slanghoek	98.5	2.92	10.47	.022	.028	.136
107	„ ..	De Doorns..	74.1	.62	2.48	.048	.085	.052
108	„ ..	Stettin	75.2	.96	3.38	.044	.067	.047
109	„ ..	Wagenboom	33.2	.17	.44	.038	.015	.022
110	„ ..	Vendutie Kraal ..	88.6	.69	3.03	.086	.048	.033
111	„ ..	Karbonaatjes Kraal..	52.2	.09	.57	.016	.034	.024

It will be observed that in no single instance does the reserve stock of either lime or potash rise as high as .1 per cent., and only in one case, that of sample No. 106, from the farm Slanghoek, in the Worcester Division, does the percentage of phosphoric oxide exceed .1. The average percentages of the reserve plant food in these 46 sandstone soils are as follows:—

Lime	.034
Potash	.031
Phosphoric oxide	.036

Lying conformably above the Table Mountain sandstone are beds of what is known as the Bokkeveld series. These consist of alternate layers of shales and sandstones, the lower bands of the series being fossiliferous. It would, perhaps, have been difficult to predict, without previous practical agricultural experience, what would be revealed by chemical analysis of soils derived entirely from the Bokkeveld beds; nor is it easy to tabulate—bearing in mind the circumstances under which the samples were collected—a list of soils formed solely from the beds in question; for, to the reasons which operate against this in other cases, there must here be added this, that the Bokkeveld beds occur *mostly* in valleys, and the resulting soils are, therefore, as a general rule, diluted, or otherwise influenced by the disintegration and decomposition of the rocks composing the surrounding hills and mountains. Hence, there are very special difficulties involved in sorting out many Bokkeveld soils that could really be called typical, from the samples that have been dealt with in our laboratories. I have, however, made a choice of eighteen, which may fairly be considered to represent solely Bokkeveld-derived soils; the results of the analyses of these are given in the following table:—

VIII.—BOKKEVELD SOILS.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
112	Ladismith ..	Buffelsfontein ..	86.8	1.66	4.97	.150	.274	.073
113	Robertson ..	Harmonie I.	80.5	1.23	5.41	.122	.153	.079
114	„ ..	Harmonie II..	83.9	1.07	3.92	.564	.095	.047
115	„ ..	Het Kruis..	80.8	1.13	4.64	.114	.250	.120
116	„ ..	„	95.2	1.49	5.71	.742	.202	.193
117	„ ..	Baden	49.3	1.93	5.28	.808	.331	.148
118	„ ..	„	94.7	1.28	6.07	.600	.247	.139
119	Swellendam .	Poortfontein	62.7	.31	1.32	.046	.176	.036
120	„ ..	Uitvlugt	81.0	2.04	6.92	2.518	.416	.234
121	„ ..	Doorn Rivers Vallei	72.8	1.21	5.76	.042	.262	.134
122	„ ..	Doorn Rivers Vallei	80.3	1.18	5.95	.106	.272	.151
123	„ ..	Lemoens Hoek ..	89.0	1.21	5.69	.170	.197	.122
124	Uniondale ..	Kamanassie Wagen Drift	57.9	1.54	7.10	.102	.182	.095
125	„ ..	Wilgehouts Rivier	93.2	1.09	4.96	.048	.212	.104
126	„ ..	Roode Heuvel ..	81.7	.87	3.34	.098	.255	.122
127	Worcester ..	Keurbosch Kloof .	71.7	.96	4.67	.136	.164	.086
128	„ ..	„ ..	79.0	.98	3.89	.442	.139	.077
129	„ ..	Stinkfontein.. ..	70.6	1.64	6.65	.162	.324	.156

On comparing the above table with the preceding one, it immediately becomes plain how greatly these Bokkeveld soils differ from those of the Table Mountain series. While the proportions of lime, potash and phosphoric oxide practically never exceed .1 per cent. in the sandstone soils, they rarely fall below that figure in the typical soils of the Bokkeveld series. The average percentages of plant food in these eighteen soils work out as follows: —

Lime	.387
Potash	.231
Phosphoric oxide	.118

It is difficult to say, in default of a previous thorough investigation of soils which are known to be productive in this Colony, what proportions of plant food may be considered to render a soil either chemically rich or of normal fertility, but, basing our opinions on European and American standards, we may affirm that, while the sandstone soils shew an all-round poverty, our analyses reveal the average Bokkeveld soil to be satisfactorily provided with all three the essential inorganic elements of plant food.

Just here we touch upon a somewhat curious feature. As far as can be gathered, the soils in Table VII. represent undoubted sandstone soils, and those in Table VIII. purely Bokkeveld soils, but in various localities a number of soils have been taken from near the line of junction between the Table Mountain and Bokkeveld series. In some cases the underlying rock belongs to the former series, in others to the latter, but in both cases I have noticed a peculiarity in the composition of these "junction" soils, the nature of which will become evident upon glancing through the next table.

IX.—BOKKEVELD NEAR JUNCTION WITH TABLE MOUNTAIN SANDSTONE; OR *VICE VERSA*.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
130	Ladismith ..	Papenkuilsfontein	60.5	.64	2.36	.056	.136	.042
131	Robertson ..	Donkerkloof	90.1	1.08	6.18	.064	.126	.061
132	" ..	"	80.9	.65	4.33	.032	.180	.068
133	" ..	Harmonie I.	70.2	.98	4.52	.016	.147	.050
134	" ..	Het Kruis Pad ..	71.1	1.20	6.45	.038	.125	.079
135	" ..	" ..	64.7	.90	3.63	.050	.078	.074
136	Swellendam .	Het Goed Geloof..	62.5	2.00	11.03	.074	.210	.201
137	" ..	Barrydale..	83.4	1.16	6.12	.040	.250	.096
138	Worcester ..	De Doorns..	81.6	.69	3.14	.050	.113	.049
139	" ..	Klein Straat	93.8	.57	3.01	.022	.105	.054
140	" ..	Ezeljagt	77.0	.39	2.01	.024	.077	.052

I regret that not more than eleven soils are available for the purpose of illustrating the point involved. It will, however, be seen that, while these soils resemble those of the Table Mountain series in regard to the amounts of lime and phosphoric oxide contained, they approach the Bokkeveld soils in respect of their potash content. This feature is, perhaps, better distinguished on taking the averages, which, for the last table, are as follows:—

Lime .. .	.042
Potash .. .	.141
Phosphoric oxide	.075

If these were simply Bokkeveld soils diluted by alluvial sand from the Table Mountain series, one would expect a lowering of *all* three the plant food constituents in the same proportion; but, as we see, the reduction of lime and phosphoric oxide is proportionately much greater than that of the potash. It puzzled me at first to account for this, but one explanation seems feasible. Dr. Corstorphine, in his second report on the Geological Survey of the Colony,* remarks on the distinctive character of the lowest beds of the Bokkeveld series, which enables one with little or no difficulty to draw the line of separation between it and the Table Mountain series below. The basement beds of the Bokkeveld series, he says, are felspathic and micaceous, and quite different from the hard compact quartzite of the older series. I am not aware whether it is potash felspar that is here alluded to, and our analyses, as before observed, do not furnish data with regard to the *total* amounts of the plant food constituents in the soil, but it seems just possible that in this fact lies the explanation of the predominance of potash in what appear to be primary soils collected near the common horizon of the two series. It would certainly be of interest to investigate the subject more closely, so as to confirm or disprove the hypothesis here suggested. For this purpose samples of soil would have to be collected in such a manner as to render it absolutely certain that they were primary soils representing the vicinity of the line of junction; in the past the collection of soils has been carried on largely without regard for geological considerations. The time has now arrived, I think, for greater precision in this respect.

---

* *Ann. Rept Geol. Commission*, 1897, p. 16.

It may be pointed out just here that one of the soils classed as a true Bokkeveld soil, No. 119 in Table VIII., bears a considerable resemblance in chemical composition to those enumerated in Table IX. Its potash, compared with the deficiency of lime and phosphoric oxide, is high, but not so high as the general run of true Bokkeveld soils, and in both lime and phosphoric oxide it is the poorest of the Bokkeveld soils. I have classed it among the latter because of its geographical position, but it appears almost certain, upon the basis of the reason just stated, that it must have been derived from the basement beds of the Bokkeveld series.

Above the Bokkeveld beds, and therefore geologically of more recent date, are those of the Witteberg series. They consist of quartzites associated with shales, and the soils thence derived would, therefore, be expected to conform in chemical character with those resulting from the older Table Mountain series. I regret that only four of the soils analysed in our laboratories can be assigned with any definiteness to this formation. The results of their analyses are as follows—

X.—WITTEBERG SOILS.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
141	King William's Town	Evelyn Valley ..	97.5	6.26	16.60	.050	.082	.105
142	Ladismith ..	Elands Vallei ..	85.3	.93	4.08	.036	.071	.068
143	Victoria East	Hogsback	99.6	5.87	10.72	.028	.038	.055
144	Worcester ..	Matjes Kloof ...	70.7	.93	1.53	.088	.041	.033

On account of their fewness it is scarcely permissible to compare these four soils with the forty-six derived from the Table Mountain series; but, as has already been remarked, it is one of the purposes of this paper to point the need of greater exertion, and, on that ground, it may not be unfitting to emphasise paucity of information so as to induce fuller investigation. There are vast tracts of country dominated and influenced by ranges of mountains built up of the Witteberg beds, and, if the investigations proposed by me about a dozen years ago had been both embarked upon and prosecuted with the alacrity fondly pictured at the start, it is possible that the soils of extensive areas would ere now have been mapped out in such a way as to shew, at all events in some respects, how they answer chemically to the requirements of fertility.

These observations come in most suitably just at this stage because it was precisely in connection with the Witteberg soils that I was first led to propose to the Government of the day that a systematic agricultural survey of the Colony's soils should be taken in hand, impelled thereto by the results of analyses I had made of soils from the Albany and Humansdorp Divisions, in both of which areas that bone disease in stock, vernacularly termed "lamziekte" (literally "lame sickness") prevailed.

The soils of a great part of the Albany Division, and of the adjoining divisions of Bathurst and Willowmore, are apparently largely derived from the quartzites of the Zuurberg range, which is entirely built up of rocks of the Witteberg series; while almost throughout the whole of the Humansdorp Division the soil is the result solely of disintegration of the great ranges of Table Mountain sandstone which extend along the south coast from George, and eventually die out in the Zitzikama range. These sandstones and quartzites contain practically nothing capable of affording nutriment to plants, and are almost devoid of the very mineral salts essential for the production of bone material. It would be of more than interest to have the areas that are coverel by these poor soils mapped out as exactly as possible, so as to shew their extent, and yet these all-important investigations have been absolutely dormant these seven years past.

The average results of the above Witteberg soils may as well be added for comparison with those already given. They are as follows:—

Lime	.051
Potash	.058
Phosphoric oxide	.065

These soils, as before remarked, may be expected to resemble those from the similar sandstones of the Table Mountain series. There is, however, more clayey material in the Witteberg rocks, and hence—if the subject were more closely investigated—we should probably discover that the soils derived from them do not exhibit *quite* the absolute poverty of the Table Mountain sandstone-soils. It is true that the above four analyses, representing the Witteberg series, are along the line of this view, but they are altogether too few in number to add any confirmation thereto.

The soils derived from the Dwyka series, which overlie the Witteberg beds, lead us from the Cape into the Karoo system, where we meet with an all-round richer type of soil than the average of the older system. Of the soils which represent the Dwyka beds of shales and conglomerates we have unfortunately examined only two that can be taken as in any way typical, and both of these were collected within the Worcester Division. Their analyses resulted as follows:—

XI.—DWYKA SOILS.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
145	Worcester ..	De Hoek	84.1	3.80	6.85	1.640	.157	.065
146	„ ..	Aan de Doorn Rivier	86.6	1.08	2.54	.386	.119	.052

We cannot, of course, generalise from the results of two analyses; all that can here be said is that these two differ from those of the Table Mountain and Witteberg sandstones, on the one hand, by shewing adequate proportions of lime and potash, and from the Bokkeveld soils, on the other, in their relatively low phosphoric oxide. The matrix of the rocks constituting the conglomerates is composed of quite a variety of minerals, amongst which felspar, augite, and calcite are prominent, and would probably disintegrate into just such soils as are typified in the above two analyses.

Passing over the intervening rocks of the Karoo system, in respect of which it would be difficult, for several reasons, to submit any analyses of typical soils at the present stage, we have next to glance briefly at the upper series of this system, namely, the Stormberg series, which we may group with the Burghersdorp or uppermost beds of the Beaufort series just below them. These consist of sandstones, shales, and clays, interspersed with calcareous rocks, and producing soils of a red or purplish colour. I do not think that we can assign any of these soils, that have hitherto been analysed, as definitely to certain geological series as in the case of the older rocks, partly because many of the samples were not officially collected At the same time a selection has been made of soils taken from localities where the influence of the Stormberg and Burghersdorp beds was most likely to have been traced in their composition. They are comprised in the following table:—

XII.—BURGHERSDORP BEDS AND STORMBERG SERIES.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
147	Albert	Odendalstroom ..	94.6	2.44	3.71	.540	.048	.138
148	„	„ ..	95.2	2.10	2.68	.424	.051	.089
149	Aliwal North	Aliwal North . ..	99.5	3.23	3.66	.376	.079	.088
150	„ ..	„ . ..	99.4	4.07	4.32	.276	.123	.087
151	„ ..	„	98.0	3.61	4.17	.192	.128	.057
152	„ ..	„ . ..	97.7	5.08	4.73	.036	.123	.056
153	Colesberg ..	Oorlogspoort.. ..	91.1	2.49	3.73	.046	.156	.068
154	„ ..	„	92.7	2.67	3.69	.094	.165	.072
155	„ ..	„	93.8	2.94	3.84	.114	.183	.070
156	„ ..	„	97.6	4.40	6.51	.506	.203	.115
157	„ ..	„	98.1	2.33	3.84	.066	.184	.073
158	„ ..	„ . ..	94.7	3.51	3.81	.216	.136	.069
159	Queenstown .	De Boulogne	99.5	6.94	6.36	.232	.341	.074
160	„ ..	„	98.3	10.08	10.75	.852	.237	.069
161	„ ..	„	92.4	5.94	6.05	.346	.235	.145
162	Steynsburg ..	Zout Kuil..	94.8	6.19	3.34	.042	.195	.031
163	„ ..	„	92.9	2.89	3.23	.448	.152	.038
164	„ ..	„	97.8	5.65	4.81	.062	.181	.089
165	„ ..	„	97.5	4.28	4.25	.062	.213	.121
166	„ ..	„	91.1	4.00	4.26	.044	.189	.097
167	„ ..	„	98.0	5.58	5.09	.066	.257	.093
168	„ ..	Klerk's Kraal ..	98.4	4.33	4.09	.238	.196	.013
169	„ ..	Middel Water ..	98.8	4.27	3.79	.130	.192	.037
170	„ ..	Van Vuurens Kraal	98.0	3.99	3.99	.188	.161	.080

The most remarkable feature about these soils is that they are all very uniform in texture and fine in grain, as may be noticed on glancing down the column headed "fine earth." The effect of the calcareous rocks is seen in the relatively large proportions of lime in some of the soils; their irregular occurrence in the very small percentages exhibited by some others. There is, in fact, much less range in the potash than in the lime of these soils.

The averages for these Burghersdorp and Stormberg soils are as follows:—

Lime	.233
Potash	.172
Phosphoric oxide	.078

The next class of soils that we have to deal with belongs to the Uitenhage series, and more particularly to the geological base of that series, namely, the Enon conglomerate. The formation is of a more recent date than any of those previously considered, and we here pass from the Karoo to the Cretaceous system. The Uitenhage series consists of shales, clays, and sandstones, with limestone bands and marls. A fair proportion of lime may, therefore, be expected in the soils to which these rocks give rise, and in the following table this anticipation will be seen to prove correct.

XIII.—UITENHAGE SERIES.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
171	Knysna.. ..	Gaanze Vallei ..	99.5	2.19	6.31	.116	.054	.045
172	,, ..	Witte Drift	90.8	1.60	6.42	.112	.069	.044
173	,, ..	Matjesfontein ..	84.4	1.33	5.16	.112	.039	.078
174	Oudtshoorn .	Vlakte Plaats ..	89.5	2.06	6.25	1.170	.299	.150
175	,, ..	Riet Vallei	56.0	.65	1.85	.154	.100	.074
176	,, ..	Oudtshoorn	69.9	3.73	4.33	.100	.149	.058
177	,, ..	Blaauwboschkuil .	91.5	1.97	4.31	.530	.211	.134
178	,, ..	Welbedacht	91.0	.87	2.50	.606	.144	.124
179	,, ..	Jan Fourie's Kraal	95.9	.84	2.36	.172	.161	.063
180	,, ..	Welgerust..	91.1	1.57	2.65	.170	.170	.063
181	,, ..	Adjoining Buffels Vlei..	81.9	.44	1.64	.046	.098	.049
182	Uitenhage ..	Upper Landdrost.	99.5	2.70	4.72	.182	.292	.073
183	,, ..	,, ..	98.9	.79	2.56	.156	.197	.068
184	,, ..	Gouvernements Belooning..	99.1	1.92	5.62	.718	.333	.143
185	,, ..	Gouvernements Belooning	98.3	1.07	3.30	.078	.108	.075
186	,, ..	Klaas Kraal	93.2	.94	3.64	.392	.239	.116
187	,, ..	,, ...	100	1.35	3.63	.592	.226	.086
188	,, ..	,, ...	98.4	.90	2.90	.066	.178	.068
189	,, ..	,, ...	99.6	1.02	2.54	.182	.185	.092
190	,, ..	Malmaison	95.8	1.22	3.48	.278	.276	.087
191	,, ..	,, ...	99.2	1.18	3.73	.338	.278	.132

It is interesting to note how closely these Uitenhage soils resemble those of the preceding table in respect of their plant food content. In each case the average is slightly higher than in the Burghersdorp and Stormberg soils, namely:—

Lime	.299
Potash	.181
Phosphoric oxide	.087

Not many analyses have been made of soils representative directly and solely of recent superficial deposits. Two samples, one of which is a type of the blown sands that cover the Cape Flats, yielded the results given below:—

XIV.—SAND DOWNS.

Serial No.	Division.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
192	Knysna ..	Sidgefield.. ..	96.4	.56	1.71	.090	.050	.051
193	Stellenbosch.	Eerste Rivier..	98.1			.066	.010	.003

Both of these, it will be seen, are very poor in plant food generally.

Of quite a different type are the silts transported, some of them over distances of hundreds of miles, by streams and rivers. The composition of our river silts is far too vast a subject to discuss at this stage, but it is one that calls for much close study and patient investigation. Silts are proverbially fertile, a circumstance which is due, not only to their chemical composition, but to their mechanical condition as well. To this the Oudtshoorn Division, whose soils are so largely made up of the silts and clays brought down from the Karoo by the Gamka and Olifants Rivers, owes its productiveness. Amongst all the soils that have been analysed in the Government Laboratories, none occupy a higher place than those of the Oudtshoorn Division, and much of the rich soil of that area is now being carried away into the sea by the Gouritz River, especially at times of disastrous flood, although some of it is retained and deposited in the Mossel Bay and Riversdale Divisions as the river passes through them on its seaward course.

Eleven analyses of such river deposits have been made by means of the standard method, with the results below given.

XV.—ALLUVIAL SILTS AND RIVER DEPOSITS.

Serial No.	Division.	River.	Farm.	Fine earth.	Water.	Organic matter.	Lime.	Potash.	Phosphoric oxide.
194	Gordonia ..	Orange ..	Upington	100	3.23	3.49	.582	.093	.061
195	„ ..	„ ..	„	100	1.68	2.05	.400	.065	.052
196	Albert	„ ..	Odendaalstroom	100	3.46	4.42	1.372	.042	.149
197	Prieska.. ..	„ ..	Zeekoebaard	100	5.09	14.81	1.444	.473	.221
198	Kimberley ..	Vaal ..	Warrenton	91.5	2.50	3.34	.275	.108	.074
199	„ ..	„ ..	Warrenton .	88.2	6.29	5.07	.346	.094	.070
200	Ladismith ..	Buffels ..	Buffelsvallei	65.0	.93	4.04	.332	.166	.106
201	„ ..	„ .	Zeekoegatsdrift	97.5	.92	4.39	.344	.187	.097
202	Swellendam.	Louws ..	Zevenfontein	97.2	.64	3.59	.220	.146	.082
203	Knysna ..	Keurbooms	Matjesfontein	97.1	3.05	11.92	.544	.105	.110
204	Libode . ..	St. John's	Isinuka	97.2	2.73	16.5	.520	.171	.137

They shew considerable variety, both in texture and in chemical composition. The proportions of lime, potash and phosphoric oxide average as follows:—

Lime	.584
Potash	.153
Phosphoric oxide	.106

I append, in tabular form, a summary of the average results obtained from the various types of soil reviewed during the course of these remarks. This may serve to bring out more clearly the characteristic differences in respect of plant food. The average amounts of water contained in each class of soil when air dry have also been added. The low water-retentive capacity of the soils of the Malmesbury and Table Mountain series will be noted, as also the large amounts of moisture retained by the Upper Karoo soils of the Burghersdorp-Stormberg type.

XVI.—AVERAGES.

Geological Formation.		Number of soils analysed.	Water.	Lime.	Potash.	Phosphoric oxide.
Pre-Cape Rocks ..	Malmesbury Series ..	14	.94	.039	.039	.039
	Granite	9	1.19	.049	.069	.048
	Campbell Rand Series		3.99	4.169	.048	.057
	Olive Shales..	21	2.08	.310	.067	.051
Cape System ..	Table Mountain Series	46	1.08	.034		.036
	Bokkeveld Series ..	18	1.27	.387		.118
	Common horizon of Table Mountain and Bokkeveld Series	11	.93	.042	.141	.075
	Witteberg Series ..	4	3.49	.051	.058	.065
Karoo System.	Dwyka Series	2	2.44	1.013	.138	.059
	Burghersdorp Beds and Stormberg Series	24		.233	.172	.078
Cretaceous System ..	Uitenhage Series ..	21	1.44	.299	.181	.087
Recent Deposits	Sand Downs	2	—	.078	.030	.027
	Alluvial Silts and River Deposits..	11	2.86	.584	.153	.106

In placing these results of some of our work before you I must again express my sense of their meagreness. The investigations have now been in progress for some twelve years, or rather, they were *started* twelve years ago, but it must be confessed that, when the period of time is taken into account, there is very little to shew. The Director of the Geological Survey of the Colony, in his report for 1904, remarks that, at the rate his work of mapping the Colony geologically is progressing, the task will take over thirty years to complete. I have a similar plaint to utter, but on our side a century will probably be the minimum limit, unless an earnest effort be made to tackle one of the most important investigations that can be undertaken in the interests of the country's agriculture.

The value of agricultural development is slowly dawning upon the people of this Colony. Quite a new interest is being taken in farming pursuits, and not a few look upon the agriculturist as the only man who can re-establish the national prosperity, and place it on a firmer and permanent basis. Surely, then, if ever there was a time for more than ordinary energy in the direction of developing agricultural resources, it is now; now, while the country is pulling itself together after having passed through an acute financial crisis; now, while everyone is anxiously on the watch for the opening up of any possible means of emergence from this commercial depression. Within the whole range of agriculture there is scarcely any matter so fundamental to its successful practice, and so radically associated with a correct apprehension of scientific theory as a study of the soil and its requirements. In fact, as Professor Hilgard, of the University of California, and Director of that State's agricultural experiment station, remarks—in the preface to a work on soils which has only just issued from the Press, and will doubtless soon come to be regarded as classic—speaking of the investigation of soils with a view to the determination of their adaptation, permanent value, and the best means of cultural improvement: "It is not easy to imagine a subject of higher direct importance to the physical welfare of mankind, whose very existence depends on the yearly returns drawn by cultural labour from the soil."* This, then, is my excuse for trespassing on your indulgence with an incomplete record; the hope that, attention having thus been drawn to its importance and value, and interest awakened or stimulated in the results derived therefrom, the investigation may speedily be resumed with greatly augmented energy, and pursued with a patient earnestness of purpose, that will be sure to bring to those who either participate in or foster this work, the realisation of their endeavours and aspirations—material assistance to the agricultural prosperity of the Cape Colony.

---

*E. W. Hilgard; *Soils: their formation, properties, composition, and relations to climate and plant growth*, 1906, page xviii.

THE IRRIGATION ACT, No. 32 OF 1906.

The subjoined Memorandum on the Irrigation Act, No. 32 of 1906, is published for general information—

The main object of the Act passed during the last Session of Parliament and assented to on the 21st August, 1906, was to consolidate with such amendments as experience had proved necessary the statutory laws relating to Irrigation.

The Act is divided into eight parts:—

Part I.—Preliminary.
Part II.—Utilization of streams.
Part III.—River Districts and Boards.
Part IV.—Irrigation Districts and Boards.
Part V.—Water Courts.
Part VI.—Servitudes.
Part VII.—Irrigation Loans.
Part VIII.—General.

PART I.—PRELIMINARY.

Under this part provision is made for the repeal of previous Irrigation Acts, and for all Regulations issued under previous Acts remaining in force until revoked or replaced by Regulations under this Act.

The following words are also defined:—"Minister," "Stream," "Perennial Stream," "Intermittent Stream," "Owner," "Riparian Land or Property," "Riparian Owner," "District," "Board," "Government Irrigation Work," "Person," "Regulation," "Director," "Superior Court."

As it will be necessary hereafter to refer to the Regulations regarding Perennial and Intermittent Streams the full text of the definitions is subjoined.

"*Perennial Stream*" means a natural stream which in ordinary season flows for the greater part of the year in a known and defined channel, and the water whereof is capable of being applied to the common use of the riparian proprietors. Provided that a stream which in part only of its course satisfies these conditions shall be deemed to be a "perennial stream" in so far only as regards such part.

"*Intermittent Stream*" means a stream which is not a perennial stream, and into which the natural surface drainage waters flow from the lands of more than one riparian property. Provided that a stream shall not be deemed to be an intermittent stream above the highest point of its course at which the natural surface drainage waters from the lands of more than one riparian property unite, or for such lower portions of its course as satisfy the conditions of a perennial stream.

From the above it will be seen that these two classes of streams require different methods of treatment for the utilization and apportionment of their waters.

PART II.—UTILIZATION OF STREAMS.

This part of the Act deals principally with the use of water of perennial and intermittent streams, permits for use of surplus water or intermittent streams, and the diversion of surplus water of a perennial stream across a watershed. The use of water of perennial streams has been judicially decided upon from time to time and the definition in the Act quoted in the first part practically follows the judgments of the Supreme Court.

Owing to the circumstances of the country, however, a stream might be perennial for a certain portion of its course and non-perennial in another portion, hence it has been provided that a stream which in part only of its course flows for the greater part of the year in a known and defined channel and the water whereof is capable of being applied to the common use of riparian proprietors shall be deemed to be a perennial stream in so far only as regards *such part.*

Under Section 6 of the Act it is stipulated that every riparian owner is, subject to all existing rights of other persons and to the provisions of this Act, entitled to a reasonable use for purposes of irrigation of the water of a perennial stream with reference to which his property is riparian.

Until the passing of this Act there was practically no protection afforded by law to user of flood water in the Cape Colony or to people who dealt with intermittent streams. As has-been pointed out, the conditions in respect of utilising the water of a river which is in flow for only thirty or forty days are quite different from those of a river which is in flow throughout the greater part of the year. Any artificial channel which is in flow for a very short period must, in order to irrigate the same area as one which is almost constantly in flow, be made of much larger carrying capacity, and must be more costly to construct. As a rule, storage works are also necessary to utilize the water of an intermittent stream. The rights of riparian proprietors to the water of intermittent streams are now clearly laid down in Section 7 of the Act.

Subject to certain provisos, and to the existing rights of others, every riparian owner is entitled to use the water of an intermittent stream flowing on to or over his property, by diverting it on to his riparian land for the irrigation thereof: and is also entitled to impound and store such water for irrigation and for domestic, agricultural, manufacturing and drinking purposes In the case of both perennial and intermittent streams the quantity which an owner is entitled to use is subject to appeal to the Water Courts.

It must, however, clearly be borne in mind that under the provisions of the Act there can be no interference with the rights of any person, who by grant, servitude, or prescription has acquired any right to the water of an intermittent stream.

Under Section 9, a Water Court is entitled to grant permits for the use on *non-riparian* land of the surplus water of an intermittent stream after the requirements of irrigation, domestic, agricultural, manufacturing and drinking purposes on the riparian land have been provided for.

Special attention is invited to Section 10, which deals with a provision for taking water from one catchment area to another. Water cannot, however, be taken away to the detriment of the rights of riparian owners, and the Water Court, on application, must determine the point at which the diversions shall take place, the line of passage for the conveyance of the water authorised to be diverted, the nature of the works to be constructed for the purpose, and the amount of compensation, if any, to be paid to the proprietor or proprietors on or over whose property the diversion and conveyance takes place.

Under Section 12 an owner is allowed permission to have access to a stream, even if its course has altered from natural causes, so that he may water his stock and prevent his riparian rights being interfered with.

Section 15 deals with surveys and investigations, and, provision is made for the establishment of gauge posts for recording the variations in the level of water in the principal streams, the preparation of maps of different streams, the collection of facts and the prosecution of surveys in a systematic manner, the preparation of detailed surveys, plans and estimates for Government Irrigation Works, engineering assistance to Water Courts, River Boards and persons in dispute as to the use of water, the examination of lands, plans, specifications and estimates and reports connected with any irrigation scheme for which application has been made for a Government loan and investigations as to:—

1. The working and results of the law with regard to irrigation.
2. The use and value of water in and for purposes of irrigation.
3. The use and local suitability of different kinds of power and machinery for lifting water for irrigation purposes.

PART III.—RIVER DISTRICTS AND BOARDS.

The necessity has long been recognised of having some control over the distribution of water of perennial and intermittent streams, and under this part of the Act the management and control of the rivers and streams of the Colony, and supervision of the distribution in accordance with established rights of their waters are now placed in the hands of local elected bodies called River Boards, assisted in technical matters by professional advice, provided at the cost of the Government. All orders or acts of these Boards are subject to appeal to the Water Court for whose guidance the Governor, with the approval of the Supreme Court or of Parliament, may lay down the principles and considerations upon which the waters of perennial and intermittent streams should be apportioned. The constitution of River Districts is practically on the lines laid down in the formation of Irrigation Districts under the old Act, No. 8 of 1877.

In order to establish a River Board any three or more riparian owners, entitled to use the water of a stream or streams and owning not less than one-tenth part in area of the riparian land irrigated from or of the properties riparian to the stream or streams within the limits of the proposed district, may present a petition in writing to the Commissioner of Public Works for the constitution of a River District. The fact of the petition having been presented must be notified by the Minister in the *Gazette* and in some newspaper circulating within the proposed district.

As soon as any petition is received an Engineer will be sent to enquire into the subject matter of the petition, and as soon as may be will report the result of his enquiry to the Minister, who, before proclaiming the area a River District, must satisfy himself that the owners of more than two-thirds of the total area of the properties riparian to the streams within the proposed District, or the owners of more than two-thirds of the riparian land irrigated from the streams within such properties, who shall also in each case represent more than two-thirds of the total number of owners, are in favour of the creation of the district.

The boundaries of a River District may be altered from time to time by procedure similar to that necessary in the formation of a new district.

The superintendence of Acts relating to the conservancy of streams and the storage, diversion and use of their waters in a River District, is vested in a River Board consisting of not less than three and not more than eleven, as the Governor may fix by proclamation in the *Gazette*.

A River Board, as soon as possible after election, is required to prepare a schedule of the rateable area of such property in the district, regard being had to the share or volume of water of the streams within the district which the owner has a right to use on the property, and to the number of morgen which could ordinarily and with due precaution against waste be efficiently irrigated in the course of a year by that share or volume irrespective of the number of morgen actually irrigated.

The basis of voting for members of a River Board is:—

(*a*) The rateable area of the property, if the rateable areas of the district have been determined.

(*b*) The possession of riparian property and its valuation respectively if the rateable areas have not been determined.

The valuation of a property is the latest valuation of the property for Divisional Council purposes in pounds sterling.

Every owner of property of which the rateable area is not less than one morgen may vote at an election of members of the Board. Provided that:

(1) If a property is owned jointly by two or more persons each of whom does not in fact occupy a separate and defined portion of the property, then if the total number of morgen in the rateable area of the property is not less than the total number of such persons, each of them may vote in respect of a rateable area equal to the total rateable area of the property divided by the number of persons, otherwise only so many of them may vote as there are morgen in the property; but if the rateable areas have not been fixed, if the total valuation of the property divided by a hundred is not less than the total number of such persons, each of them shall be entitled to vote on the basis of a property valuation arrived at by taking the total valuation of the whole joint property and dividing it by the number of owners; otherwise only so many of them may vote as there are hundreds of pounds in the property valuation, and in either case the owners shall determine amongst themselves and appoint, in writing, such of them as are thus capable of voting.

(2) If the property is owned by Government or a corporate body, the person duly authorised under a special power of attorney from the Minister or body respectively, shall be entitled to vote in respect of that property, and he shall vote as if he were the owner and on the same scale.

(3) A person entitled to vote in respect of property situated in a sub-district shall, in respect of that property, vote at the election of members for that sub-district only.

(4) No person shall be entitled to vote if and while his rates under this Part are due and in arrear for three months or more.

Every person exercising his right to vote shall vote upon the following scale if the rateable area is the basis of voting:—

He shall have one vote for every five morgen or part of five morgen of irrigable area in respect of which he is entitled to vote up to 50 morgen, and thereafter an additional vote for every additional 25 morgen; or, if the valuation of the property is the basis of voting, he shall have one vote for every £500 or part of £500 in the valuation of the property in respect of which he is entitled to vote.

Whenever it appears that the order or act of any River Board is likely to affect detrimentally the rights to property within the District of some other River Board or Boards or whenever it may appear necessary that some act should be performed relating to more than one River District, the Governor may appoint a Special River Board consisting of an equal number of members nominated by each Ordinary River Board concerned and of one member to be appointed by the Governor; provided that in no case shall the total membership of Special River Board exceed seven.

(*a*) A River Board has no power to institute or defend any action involving a declaration of rights without the consent of two-thirds of the riparian owners within the district at a meeting specially called for that purpose.

Any person aggrieved by an order or act of an Ordinary or Special River Board may make application for relief to a Water Court or other competent Court.

(*b*) A River Board may, with the consent of the ratepayers, given at a meeting specially convened for the purpose, levy rates, to be called River Rates, for defraying all expenses incurred or to be incurred by the Board.

The rates shall be levied upon every property having a rateable area in the District, and shall be payable by the owner of the property.

A River Board may, with the consent of three-fourths of the owners of rateable property in the district, who shall be owners of not less than two-thirds of the rateable area therein, present a petition in writing to the Governor praying that such Board be vested with all or any of the powers of an Irrigation Board.

The Commissioner of Public Works may pay any expenses incurred by a River Board for the purposes of the Act during a period of twelve months from the creation of the district, provided that the total amount so paid shall not exceed one hundred pounds sterling, and an estimate of the expenditure which the Board proposes to incur shall first be approved by the Minister.

The Petition for the constitution of a River District should be substantially in the form subjoined hereto. All necessary forms will, however, be promulgated under the Regulations which are now under consideration:—

Application for Constitution of River District.

To the Honourable
The Commissioner of Public Works,
Cape Town.

We, the undersigned riparian owners, entitled to use the water of the stream(s) or river(s) ...., deeming it to be expedient that there should be a combined system of control over such stream(s) or river(s), pray that the area hereunder described containing the stream(s) or river(s), together with the properties riparian thereto may be constituted a River District.

We are owners of at least one-tenth part in area of the riparian land irrigated from or of the properties riparian to the aforementioned stream(s) or river(s).

The proposed District is bounded on the North by .... , North-east by .... , East by .... , West by .... South-east by .... and South by ....

A notice in the subjoined form will then be published in the *Gazette*:—

Notice.

Proposed .... River District.

Notice is hereby given, in terms of Section 16 of Act No. 32 of 1906, that a Petition has been presented to the Commissioner of Public Works, a copy of which is set forth hereunder.

PART IV.—IRRIGATION DISTRICTS AND BOARDS.

There is practically nothing new in this part of the Act. The provisions of Act No. 8 of 1877 have been followed and have been simplified where experience has proved necessary.

Any three or more owners of land, who deem it expedient that there should be a combined system of irrigation, and that recourse should be had to artificial means of storing or supplying water, may present a petition in writing to the Commissioner of Public Works praying that the area be constituted an Irrigation District. The persons signing the petition must be owners of not less than one-tenth part of the land within the area. The petition must state the boundaries and approximate extent of the proposed irrigation district, and the nature of the works proposed to be executed. The fact of the petition having been presented will be notified in the *Gazette* and in a newspaper circulating within the proposed district. After the petition has been received an Engineer is despatched to the District to make enquiry into the allegations contained in the petition, and to determine the approximate extent of land irrigable by the proposed work on each property in the proposed District and on any other property which in his opinion should be included. After inquiry a report is presented to the Minister, who may, if he thinks fit, and if satisfied that the owners of not less than two-thirds of the total extent of the irrigable areas within the proposed district are in favour of the creation of the District, recommend the Governor to proclaim the area an Irrigation District.

The boundaries of a District may be altered from time to time after an inquiry has been made by an Engineer and the consent of owners obtained as if the properties were to be proclaimed a district.

The performance of all acts, matters and things relating to the purchase, construction and maintenance of the necessary reservoir or other irrigation or drainage works is vested in an Irrigation Board consisting of such number of members, not less than three and not more than seven as the Governor may fix by proclamation.

The provisions relating to the qualifications of voters and scale of voting and the framing of the voters' list are practically the same as for River Boards. In the case of Irrigation Boards, however, the rateable area is the only basis of voting and the maximum number of votes allowed to any voter is limited to ten for any single candidate.

An Irrigation Voters' List must be prepared and annually revised and a copy of the List must be kept at the Secretary's Office for inspection, free of charge, by any person interested.

An Irrigation Board may levy rates, to be called irrigation rates, for defraying all expenses incurred or to be incurred by the Board, and such rates must be levied annually by the Board at a uniform sum per morgen of irrigable area. A schedule of the irrigable area of each property within the District should be prepared by the Board as soon as possible after its election.

An Irrigation Board may raise by way of loan any money that is required by the Board for the purposes of the Act. Before a proposal for the raising of a loan is laid before any meeting of the Board, not less than twenty-one days' notice of the proposal must be given to each member, and no loan can be raised except under a resolution of the Board at which two-thirds at least of the members are present.

A Board may, with the consent of two-thirds of the owners of rateable property within the area of the Board present a petition in writing asking to be vested with any or all of the powers of a River Board.

The following Irrigation Districts, established under the Act of 1877, are still in existence:—

Breede River (Robertson), proclaimed 17th January, 1898.
Nonna River (Worcester), proclaimed 12th May, 1905.
Nuy River (Worcester), proclaimed 31st May, 1905.

All works undertaken by these Boards have been carried out by means of loans under the Irrigation Acts.

The forms of application for the constitution of an Irrigation District and for a Government Loan are attached.

Notice.

Notice is hereby given, in terms of Section 43 of Irrigation Act, No. 32 of 1906, that a Petition, copy of which is set forth hereunder, has been presented to the Commissioner of Public Works.

(Petitioners.)

Petition.

To the Commissioner of Public Works.

The Petition of the undersigned sheweth:—

1. That your Petitioners are the proprietors of the farms irrigated by the .... River, and situate in the District of ....

2. That your Petitioners propose (here describe the works contemplated).

3. That in order to effect the proposed works, it is expedient that the following area, comprising about .... morgen of ground, *viz.*:— (here describe the area)........................ all situate in the District of ...., the said area being bounded as follows:—

On the East by ....
On the North by ....
On the South by ....
On the West by ....

be constituted an Irrigation District, in terms (Section 43 of Part IV.) of Act 32 of 1906.

Wherefore your Petitioners pray that you may be pleased to constitute the area hereinbefore described as an Irrigation District as aforesaid.

Signature ....
Address (Farm) ....

Form.

Petition for a Loan under Act No. 32 of 1906

To His Excellency (etc.)

The Petition of (here insert names), ..., the members of the .... Irrigation Board, humbly sheweth that by Proclamation under the hand of Your Excellency, dated the .... day of .... extent about .... morgen, was constituted an Irrigation District, the Irrigation Board, therefor, to consist of .... members, a certain portion of the District of......... .. .., in to be known under the name of the . ... Irrigation Board, and that subsequently your petitioners were duly elected as the first members of the said Board

That at a meeting of the Board, held at .... on the .... day of ...., at which all your petitioners save .... were present, it was resolved to raise a Loan of £.................. (insert in words) for the carrying out of the Irrigation Works proposed to be constructed in the said Irrigation District, and to apply to the Government for the said Loan upon (here insert security to be offered) ......

That the following are the works to be constructed, and for which the said Loan is required, *viz.*:— (here insert a description of the proposed works) ....

That the estimated cost of the said works is the sum of £......... ...., according to the estimate made by ....

That your Petitioners are of opinion that of the said morgen of ground about .... morgen is irrigable ground, upon which they propose to leavy a rate of .... per morgen, and to pledge such rates as security for the Loan, together with (if immovable property is offered, insert particulars here) ....

That the present value of the land is about £............... per morgen, but your petitioners are of opinion that on the completion of the proposed works the value will be increased to about £.......... per morgen.

That your Petitioners pray that such Loan may be advanced to the Board out of the funds provided by Parliament for that purpose.

A Certificate stating that the conditions of Section 59 relative to the numbers of members present at the meeting which approved the application, and to the notice of such meeting, have been complied with, and a statement of the existing liabilities of the Board and an account of its proposed revenue and expenditure are appended hereto.

Wherefore your Petitioners pray that Your Excellency will be pleased to authorise the issue to them as the .... Irrigation Board, out of the funds provided for that purpose by Parliament, and for the purpose of enabling them to carry out the abovementioned Works, a Loan of £.................. or so much thereof as shall be found necessary for the completion of the said works upon the security of the rates, or such other security as may be approved by Your Excellency.

And your petitioners as in duty bound will ever pray.

....

Chairman.

....
....
....

Members.

....

Secretary.

PART V.—WATER COURTS.

Water Courts were first established under the provisions of Act No. 40 of 1899, and practically few changes have been introduced under this Act. The more important amendments relate to the original jurisdiction of Water Courts in water disputes (Section 68), the appointment of Special Water Courts (Section 66), the submission of matters in dispute to the Director prior to being brought before the Water Courts, and the powers of Water Courts in granting applications for

(*a*) Servitudes of aqueduct.
(*b*) Servitudes of storage.
(*c*) Servitudes of abutment.

dealt with in Part VI. of the Act.

The under mentioned Water Courts have been established under the provisions of Act No. 40 of 1899 and Proclamation No. 53 of 1903, *viz.*:—

1. No. 144, 1903, Uniondale Area and Water District
2. No. 188, 1903, Oudtshoorn Area and Water District
3. No. 189, 1903, Stutterheim and Komgha Area and Water District.
4. No. 195, 1903, Humansdorp Area and Water District.
5. No. 231, 1903, Bedford, Fort Beaufort, Stockenstrom and Victoria East Area and Water District.
6. No. 267, 1903, King William's Town Area and Water District.
7. No. 280, 1903, East London Area and Water District
8. No. 49, 1906, Willowmore Area and Water District.
9. No. 82, 1906, Kimberley and Barkly West Area and Water District.
10. No. 233, 1906, Worcester and Robertson Area and Water District.
11. No. 234, 1906, Prince Albert Area and Water District.
12. No. 250, 1906, Laingsburg Area and Water District
13. No. 349, 1906, Ladismith Area and Water District.
14. No. 464, 1906, Barkly East Area and Water District.
15. No. 412, 1906, Riversdale Area and Water District
16. No. 413, 1906, Swellendam Area and Water District.

Provision is now being made for the establishment of Water Courts in the several Districts of the Colony.

The first appeal case from the decision of a Water Court was from the District of Ladismith. The application was made for a reasonable apportionment of the water of the perennial stream called The Hoeko. There was an appeal to the Supreme Court from the judgment of the Water Court of Ladismith which was dismissed with costs, and the opening remarks of the Chief Justice in giving judgment are interesting, and are quoted in full. He said:—

"This is the first case of an appeal from a decision of a Water Court under the Act of 1899, and I am bound to say, after a careful perusal of the proceedings, that this Water Court has conducted the proceedings in a calm, judicial, and, in every sense, satisfactory way. Some doubt was expressed at the time as to whether Water Courts would be a success or not, and I must say that if all Water Courts hereafter should conduct their proceedings upon the model of this Water Court, there would be every reason to be satisfied with the Act. My own view was that it was a pity that the old Landdrost and Heemraden were abolished, because they worked satisfactorily. They were conversant with the local circumstances, and they were in a far better position to do justice between the parties than a judge trying the case hurriedly on circuit, or even the Supreme Court, hearing the case here at greater length. I say, then, that this Water Court has, it appears to me, fairly taken the place of the old Landdrost and Heemraden, and has conducted the case very well."

The Governor may appoint in any area a Water Court for the purposes of hearing and determining disputes in connection with the use and appropriation of water. Under the Act of 1899 the boundaries of the Water District usually coincided with the boundaries of some Magisterial District.

A Water Court consists of a Resident Magistrate having jurisdiction over the whole or some portion of the Water Court District, who sits with two assessors selected from a list of Water Court Assessors, not less than 10 or more than 25, selected after consultation with the Divisional Council of every Division, any part of which is situated in the District.

Every Assessor must own and occupy land, and must have cultivated his own land in the District, must possess the qualifications necessary for a Divisional Councillor, and must not be less than thirty years of age.

The Assessors are selected by the Registrar in accordance with the Regulations, and may be objected to on any one or more of the following grounds:—

1. Consanguinity of affinity within the fourth degree to any of the parties, or to any person who has a pecuniary interest in the result of the application.
2. Having directly or indirectly, an interest in the result of the case.
3. Having previously deliberately expressed an opinion as to the merits of the application.
4. Personal enmity beween one or each of the Assessors and any party.

Any objections with supporting affidavits are then laid before the Magistrate of the Water Court District, who decides either to allow or disallow the objections, and his decision is final.

A Special Water Court is established for the purposes of hearing matters or disputes relating to two or more separate Water Court Districts.

In order to avoid expense, inconvenience and delay, the clause giving Water Courts original jurisdiction in water disputes was specially inserted in the Bill, and as it is of such importance the full text is given below:—

> "Save with the consent of all parties to any dispute as to water-rights, no Court other than a Water Court shall have original jurisdiction in the hearing and settlement of such dispute: and no process to summon any person to answer any claim in a suit involving a question of water-rights shall issue out of any of the superior Courts except in cases where the

> defendants have consented in writing thereto: provided that nothing in this section contained shall affect the jurisdiction conferred by any section of this Act in any of the superior Courts, in appeal or otherwise, or in cases where the aforesaid consent has been obtained."

Apart from the question of granting applications for servitudes dealt with in the next part and the matters already referred to the more important duties and powers of Water Courts are:—

1. To grant permits for the use of the water of intermittent streams.
2. To determine, on application, the place or places either upon land riparian to a stream or upon any land higher up in the course of a stream at which an owner shall be deemed to have the right to the use of the water and the nature and extent of such use having due regard to the rights of other owners
3. On application to investigate, decide and record in the case of any stream whose character has not been defined by a competent Court whether such stream is perennial or intermittent. An appeal to a superior Court from such decision may be prosecuted within three months at the instance of an interested person.

PART VI.—EXPROPRIATION OF LAND AND ACQUISITION OF SERVITUDES.

Under Sections 82, 83 and 84, land may be expropriated under certain restrictions for a State irrigation work or within an Irrigation District for the work of an Irrigation Board.

Land may not, however, be expropriated for private Irrigation Works.

Sections 86 to 92 deal exclusively with the acquisition of Servitudes. Any person who, having a right to or to the use of water, or being entitled to superintend and control the use of water, wishes to employ it, or to increase its employment for irrigation use, or the use of stock or any other useful purpose is entitled to claim under the Act the following servitudes *temporarily* or in *perpetuity*, namely,

(*a*) Servitude of aqueduct.

(*b*) Servitude of storage.

(*c*) Servitude of abutment.

Servitude of Aqueduct consists of the right to occupy for and in connection with the passage of water, such land the property of another, as may be necessary for the purpose, including the right to construct such works as are necessary for the passage over, under or alongside of another irrigation work.

Servitude of Storage consists of the right to occupy, by flooding with water the land of another by means of a dam constructed *on the land of the person* claiming the right. The servitude shall include the right of passage over the servient tenement along the margin of and throughout the area subject to the servitude, for purposes of maintenance of works, cleansing, clearance of silt and brushwood or litter, or any like purposes necessary for the due enjoyment of the servitude.

Servitude of Abutment shall consist of the right to occupy by a dam or weir, the bed of a river and the banks adjacent thereto, the property of another, as may be necessary for the dam or weir.

A claimant to any of these servitudes must give notice in writing to the owner of the land over which he proposes to acquire the servitude, describing the line of passage along or the locality upon which and the mode in which he proposes to conduct, store or divert water, or construct works, the works which he proposes to construct upon the land, the compensation which he offers, and the period of time during which he wishes to enjoy the servitude.

If the owner does not, within one month after the service of the notice, agree to the proposals of the claimant, the claimant may apply to the Water Court for the settlement of the matters in dispute between him and the owner.

The Water Court may grant the application with modifications and, subject to such conditions as it deems equitable, award the compensation to be paid for the right of servitude, if the land is leased determine the compensation to be paid to the lessee for any injury which he may sustain by the exercise of the servitude, if the land is mortgaged determine the share to be paid to the mortgagee, in reduction of his mortgage, or refuse the application.

In fixing the amount of compensation, the Water Court may deduct such amount as it thinks reasonable in consideration of the advantages which the owners or lessee may derive by reason of the servitude.

The compensation for a temporary servitude shall be *an annuity equal to the rental value*, as nearly as can be ascertained of the land to be actually occupied by the work when completed, together with yearly compensation for any actual inconvenience and loss that may be exercised by the servitude.

The compensation for a permanent servitude shall be a *lump sum equal to the average market value,* as nearly as can be ascertained of the land to be actually occupied by the work, *together with an annuity* as compensation for actual inconvenience and loss that may be suffered by the exercise of the servitude, or in lieu of this annuity, *an amount equal to twenty times the annuity.*

A temporary servitude may be converted into a permanent servitude by the applicant paying to the owner of the servient tenement such compensation as may be agreed upon, and if compensation cannot be agreed upon, application may be made to a Water Court for the determination of the compensation.

A servitude lapses if the work proposed to be executed is not completed and the water utilized within three years from the date of the order of or the period fixed by the Water Court.

Part VII.—Irrigation Loans and Grants in Aid.

Loans may be granted to Irrigation Boards or to private owners of land.

The form of application for a loan by an Irrigation Board has been dealt with in Part IV. of the Act. The security to be offered by a Board must be the rates leviable under the Act, or such other security as may be approved by the Governor.

Loans to private owners may be conveniently divided into three classes:—

(*a*) Loans not exceeding £500.

(*b*) Loans exceeding £500 and up to £25,000.

(*c*) Loans exceeding £25,000.

The security to be offered by a private owner must be a mortgage on immovable property. Under the old Irrigation Acts the Government could only grant the loan upon the security of *the land improved*. Under this Act collateral security may be accepted and any immovable property owned by an applicant may be accepted as security for a loan.

Loan not exceeding £500.

When the loan does not exceed £500, and the amount of the loan together with any existing mortgages is under three-fourths of the Divisional Council valuation of the property, an Engineer's certificate stating that the work has been carried out in accordance with approved plans and specifications is unnecessary.

The Minister may, however, require a valuation made by two sworn appraisers instead of the Divisional Council valuation.

If the enhanced valuation of the land is taken into consideration approved plans and specifications are necessary and the amount of the loan together with existing mortgages cannot exceed two-thirds of the valuation.

Loans exceeding £500 *and up to* £25,000.

When the application for a loan exceeds £500. or the enhanced value of the work is taken into consideration, the Director is called upon to report to the Minister that the applicant proposes to construct the works in a sufficiently substantial and durable manner, and in accordance with plans, estimates and specifications approved by him.

Loans exceeding £25,000.

If the application for a loan exceeds £25,000 and is for a longer period than 30 years, the previous sanction of Parliament is necessary, in addition to the Director's report that the applicant proposes to construct the works in a durable manner and in accordance with plans, estimates and specifications approved by him.

The period of 30 years named in Section 103 (2) of the Act for the redemption of the loan is the maximum period that can be granted without the sanction of Parliament, and would be allowed only on the most permanent class of works, such as masonry, dams, and weirs, earthworks, canals, etc. The time would be shorter for less durable works according to their nature and probable durability.

In the case of pumping or other machinery it would generally be from 10 to 15 years only.

Under Section 111 of the Act, the Commissioner of Public Works is empowered to fix special rates for the carriage on Government Railways of such goods or materials as are to be used for the purposes of irrigation within the Cape Colony.

In this connection attention is invited to Government Notices No. 949 of 1904, "Railway Rebate upon Carriage of materials used in irrigation works," and No. 17 of 1907, "Proposed Railway Rebate on oil used as fuel for irrigation purposes."

The subjoined table shews the annual sum payable in half-yearly moieties, required to repay a loan of £100 with interest at 3½ per cent. within the following periods:—

Years in which Loan repayable	Annual Sum expressed approximately in currency			Annual Sum in Decimals	Half-Yearly Moiety.
	£	s.	d.	£	£
2	52	4	2	52·20648	26·10324
3	35	8	2	35·40451	17·79226
4	27	0	3	27·00858	13·50429
5	21	19	7	21·97507	10·98754
6	18	12	6	18·62276	9·31138
7	16	4	8	16·23112	8·11556
8	14	8	10	14·43991	7·21996
9	13	1	0	13·04899	6·52450
10	11	18	10	11·93824	5·96912
11	10	0	8	11·03128	5·51564
12	9	5	7	10·27713	5·13857
13	9	12	10	9·64054	4·82027
14	8	2	0	9·09630	4·54815
15	8	12	7	8·62595	4·31298
16	7	4	4	8·21562	4·10781
17	7	17	2	7·85473	3·92737
18	7	10	9	7·53501	3·76751
19	6	5	0	7·24998	3·62499
20	6	19	11	6·99442	3·49721
21	6	15	4	6·76411	3·38206
22	6	11	2	6·55562	3·27781
23	6	7	4	6·36609	3·18305
24	6	3	11	6·19314	3·09657
25	6	0	9	6·03478	3·01739
26	5	17	10	5·88933	2·94467
27	5	15	2	5·75534	2·87667
28	5	12	8	5·63159	2·81580
29	5	10	5	5·51701	2·75851
30	5	8	3	5·41067	2·70534
31	5	6	3	5·31178	2·65589
32	5	4	5	5·21964	2·60982
33	5	2	9	5·13363	2·56682
34	5	1	1	5·05319	2·52660
35	4	19	7	4·97786	2·48893
36	4	18	2	4·90720	2·45360
37	4	16	10	4·84083	2·42042
38	4	15	7	4·77840	2·38920
39	4	14	5	4·71961	2·35981
40	4	13	4	4·66419	2·33210

Forms of applications for loans for irrigation works may be had on application to the Secretary for Public Works.

PART VIII.—GENERAL.

Under this part, provision is made for the exemption of lands improved by irrigation from any enhancement of local rates for a period of ten years owing to such improvement and for an amount of £200,000 for the carrying out of the provisions of the Act, including the granting of Irrigation Loans at 3½ per cent. interest.

Copies of the full text of this Act in English and Dutch may be obtained on application to the Secretary for Public Works.

Return of Fruit Shipped from Cape Colony to England during February, 1907.

Port of Shipment.	No. of Packages.	Description of Fruit.	Quantities.	Value.		
				£	s.	d.
Cape Town.	7,690	Plums	229,648	717	14	6
,,	6,129	Pears	176,968	843	12	0
,,	2,496	Peaches	65,855	353	11	0
,,	408	Nectarines	10,249	60	18	0
,,	381	Apples	13,871	83	13	6
,,	21	Melons	428	3	1	0
,,	6	Pineapples	180		15	0
,,	1	Passion Fruit ..	25		2	6
,,	2	Quinces	150	1	0	0
	17,134		497,374	2,064	7	6
Port Elizabeth ..	18	Plums	232	6	0	0
,,	3 0	Pines	15,078	63	15	0
,,	10	Pears	68	2	0	0
,,	13	Assorted Fruits ..	800	10	0	0
	341		16,178	81	15	0
Total ..	17 475		513,552	£2,146	2	6

THE ROTATION AND MANURING OF CROPS.

PRIZE ESSAY BY G. M. GODLONTON, FORT BEAUFORT.

The following is the Prize Essay in the competition inaugurated by the Western Province Agricultural Society in connection with the last annual show. The compositions were adjudicated by Dr. Nobbs, who remarks, "Carefully thought out and adapted to Cape conditions. A trifle short, but to the point."

Under the system of agriculture practised in this country it is usual to grow year after year on the same land the same crop. This system can be followed with success as long as the land retains a considerable proportion of its virgin fertility, and can even be continued further if proper manures be applied, and the land kept in a good condition of tilth. At the same time, practical experience has fully borne out the theoretical advantages to be gained by following a system of growing a variety of successive crops on the same land. Such a system is known as

THE ROTATION OF CROPS.

So great are the benefits to be derived from such a rotation, and so well are they understood, that in countries where agriculture has been long practised there are different kinds of rotations, each kind suitable to the particular soil on which it is followed, and most favourable to the particular crop which is the most profitable in the rotation.

For instance, a typical rotation followed in England is known as the Norfolk four-course:—

1. Wheat.
2. Turnips.
3. Barley or oats.
4. Clover.

In this rotation we see that cereal crops alternate with roots and clover, and the crop of turnips is often replaced by some other root crop, such as mangels, carrots, potatoes, etc., while clover may be replaced by vetches, beans, or other leguminous crop. Wheat being probably the most important crop in the series, is preceded by clover, which stores up a considerable amount of nitrogen in the soil, the plant food most needed by the wheat. Wheat is sometimes replaced by oats. Following the wheat is a root crop. This allows a thorough cultivation and cleaning of the soil, and as a rule a heavy dressing of phosphatic and farm yard manure is applied, the barley following being manured, phosphates and artificial nitrogenous manures, such as nitrate of soda or guano.

It must not be insisted on that because a particular system of rotation is suitable to a particular soil and climate, that therefore, the same system would be profitable on other soils and in other climates. The great aim to be arrived at is to grow such a variety of crops as will yield the greatest and most profitable crops within the least space of time, and yet maintain the fertility of the soil.

The advantages to be obtained from a rotation of crops are:—

1. That there is less disease; thus mealies attacked by stalk-borers are less likely to infect subsequent crops if the latter are grown on different lands some distance away.

2. Less manure is needed; a cereal crop tends greatly to impoverish the soil of nitrates, which a leguminous crop tends largely to replace. By a good system of rotation the plant foods are used up equally, and no great deficiency of one kind of plant food is allowed.

3. The work of the farm is distributed by growing several crops, part only of the farm is at one time under such a crop as mealies, which entails great labour in keeping clean. Again, the reaping and sowing of the different crops come at different times.

4. Different crops have widely different kinds of roots. Lucerne and paspalum have very deep root systems, and draw largely from the subsoil; mealies, wheat, and mangels are deeper rooted than barley and turnips, which depend almost entirely upon a readily available supply of food near the surface. It is largely for the reason of a deeper root system that mangels give a better yield in this country than turnips, being less liable to suffer in droughts, and having a deeper range of soil to draw on for phosphates, which they largely use.

5. The climate of this country, being so variable, there is greater chance of reaping at least part of the year's crop if a rotation is followed, the rains, perhaps, happening to suit some one or other crop in the rotation.

6. For feeding stock and native servants a variety of foods is best, and it will be found that a full and profitable use can be made on the farm of all produce grown; lucerne, mealies, barley, wheat, pumpkins, rye, rape, sunflower, mangels, vetches, clovers, all in turn proving useful.

7. It should be remembered that in growing a quick succession of crops on the same land, only one rent is being paid, whether the land

is under crop or not. The crop tends to prevent plant food being carried by drainage out of reach of crops, and a large part of this is retained in the roots and stubble of the crop, and in the case of deep-rooted plants has been brought to the surface from the subsoil.

It might be profitable in the case of a land somewhat exhausted of plant food to sow it down in paspalum or other suitable grass, and leave it down for some years, thus extending the rotation. Such a system would prevent the tendency always present, when growing shallow rooted plants, towards the formation of a pan, and on ploughing the land up it would be found that it was much improved. There would be a large accumulating of humus, tending to make the soil more retentive of moisture, and less subject to drought. A further extension of such a system might be followed where fruit culture is part of the farm economy. The life of the orchard is limited, and when the trees cease to be profitable, they could be dug out and burned on the land. It would be found that the continuous cultivation of the soil, together with judicious manuring of the trees would leave the soil in much better condition than before, new orchards being planted if possible on ground taken over from the ordinary farm crops.

A useful feature in rotations of crops, especially on dry lands, is the sowing of catch crops, these being some quick growing, bulky fodder crop, such as vetches, clover, lupine, or rape, etc., to be ploughed under when coming into flower. This will greatly improve the physical properties of the soil, render it more retentive of moisture, and in the case of a leguminous crop, add nitrogen.

THE MANURING OF SOILS.

In this country the farmer is fortunate in having to deal, in the case of his cultivated lands, almost entirely with rich virgin soils. [The writer, it must be remembered, is living in the Eastern Province. —Ed., "*A.J.*"] So far he has generally been able to reap good crops, provided he properly worked the soil, and the subsequent weather conditions were suitable. With such a system, it follows that the more energetic the farmer and the better he works the soil, the sooner will the soil become deficient in one or other of the necessary plant foods.

To prevent this, he should, from time to time, supplement the natural supply of plant food in the soil by the application of manures, and the best and most economical manures to be applied will vary according to the nature and composition of the soil and the crop to be grown on it.

The essential elements of plant food derived from the soil are nitrogen, potash, phosphorus and lime. Of these, the two latter are usually most deficient in our Colonial soils; potash is generally present in fair quantity, and all soils containing much clay have sufficient potash for the needs of ordinary farm crops. By analysis a good Colonial soil might shew the presence of:

.1 per cent. nitrogen.
.1 per cent. P_2O_5.
.15 per cent. potash.
.3 per cent. lime.

It is possible, however, for a soil to contain these amounts of plant food, and yet to respond readily to an application of manure containing one or other of these substances, the contained plant food in the soil being only partly available for immediate use by the plant.

Manures may be divided into two classes, general and special, the former containing all the elements of plant food, the latter containing one or more predominant constituent. General manures entirely prevent the exhaustion of soils if used in sufficient quantity, and when they contain organic matter have a further beneficial action on the soil by increasing the amount of humus. Manures of this class available to the Cape farmer are kraal manure and stable litter. Both these vary largely in composition according to the quality of the food eaten by the animals producing them, and also the method, or want of method, in treating the manure.

Typical analyses in treating the manure shew the following results:—

Moisture, 5 to 11 per cent.
Organic matter, 30 to 71 per cent.
Ash, 22 to 56 per cent.

Organic matter containing .55 per cent. to 1.7 per cent. nitrogen of the whole amount.

Ash containing:

Potash, 1.2 per cent. to 6 per cent.
P_2O_5, .38 per cent. to 1.28 per cent.
Lime, 1.68 per cent. to 5 per cent.
The burnt sheep kraal manure might analyse:—
Potash, 3.35 to 18.5 per cent.
P_2O_5, 1.30 to 3.0 per cent.
Lime, 3.60 to 17.0 per cent.

It should be noted that sheep manure, and more especially the ash, contains a large percentage of chlorides, which is much disliked by tobacco.

Cattle manure is less heating than sheep dung, decomposes more slowly, and contains a far less percentage of plant food. It is less liable to burn the crops than sheep or horse manure; the latter decomposes rapidly, and is a hot manure.

Great care should be taken in applying all such manures to experiment as regards quantity before doing any great areas. If plenty of lime is present, they can be used more freely than otherwise, as the lime tends to keep the soil sweet.

Special manures as a rule supply only one valuable plant food to the soil, and thus they may in some cases tend to exhaust it by causing for a time larger crops, and not supplying other plant foods which may be present in insufficient quantities.

The chief special manures supply: (1) Nitrogen, as ammonium salts, nitrates, and some guanos; (2) phosphates, as superphosphate, basic slag, bones, guanos and mineral phosphates; (3) potassium, as wood ashes, kainit and other potassium salts; (4) calcium, as lime in its varying forms of chalk, marl and gypsum.

The great value of special manures is that as a rule they are concentrated, they can be easily transported, and can supply some particular constituent of which the soil is in want, or which will be specially useful to the crop to be sown. Thus, if the farmer has reason to believe that the soil of his lands is deficient in phosphorus and potash, but has plenty of other plant food, he can apply these in the form of a mixture of two special manures, such as bone meal and kainit, or superphosphate and wood ashes.

Wood ash varies greatly in value according to the kind of wood burnt, and the size of the branches. It has been used at the rate of from 300 lbs. to 3 tons per acre, the small application often repeated is the better method. Analyses might shew:—

Potash, 8 per cent. to 20 per cent.
P_2O_5, 2 per cent.
Lime, 33 per cent.

Bones are a useful phosphatic manure, but unless in a very fine state of division are but slowly available for plant use. They are often burnt and crushed, and being then in a fine powder, are of great value, containing about 36 per cent. phosphates.

Basic slag, containing about 16 per cent. P_2O_5, is a useful manure, especially on soils rich in humus and poor in lime. It is essential that the slag is in a very fine state of division.

Lime is not only an indispensable element of plant food; it helps to loosen a clay soil, to assist in decomposing organic matter, and to render available potash and phosphoric acid. It should be remembered that the effect of applying lime is more seen the second and third year after application, also from the very fact of setting free plant food it greatly helps in the long run to exhaust a soil unless the fertility is kept up by manuring.

The time within which the different classes of manure will become available, as plant food varies greatly. While manures of a soluble nature, such as nitrate of soda or sulphate of ammonia, are immediately or almost immediately available, and are applied to the crop when it has already started to grow, other manures, such as kainit, basic slag, kraal manure, and especially bone meal, are not nearly so readily recoverable in the crop, but exert an influence over a number of years. The amounts of the various manures that can be economically applied vary with the nature of the soil and other conditions of crop and climate, but about 200 lbs. to 400 lbs. per morgen of nitrate of soda or sulphate of ammonia may be used; 800 lbs. of bone meal, 400 lbs. superphosphate, 600 lbs. basic slag, 800 lbs. kainit, and 1,000 lbs. to 2,000 lbs. lime. The application of small quantities such as these frequently applied is better than very large quantities at longer intervals.

When applying manures, the mechanical or other effect of the manure on the particular soil should be considered. For instance, wood ashes or kraal manure would tend to loosen a stiff soil. It was found in actual practice on a farm near Johannesburg that the application of superphosphate and bone meal tended to cement the ground. They were then given up in favour of farm yard manure, with a resultant advantage.

Gypsum applied to a brak soil helps to neutralise the injurious salt present, and make the ground more suitable for farm crops.

Different plants require different quantities of the various plant foods, thus cereal crops are benefited by nitrogenous and phosphatic manures. Potash is especially useful to leguminous crops and fruit trees, with also phosphoric acid and lime. For potatoes, potash is nearly always useful, and often nitrogen and P_2O_5, may be added. With root crops, such as mangels, the application of nitrogenous manures is useful, but delays their maturity, and a late sown crop should receive phosphates only.

It might here be noted that in the case of Swedish turnips, grown for fifteen years in succession on the same ground at the Rothamsted Experiment Station, the surface soil became each year less easily worked, and a somewhat impervious pan was formed below. This fact is interesting as shewing one important and very beneficial influence of a rotation of crops.

The application of a phosphatic manure for swedes or turnips has a marked effect, much more so than is the case with mangels, which, having a deeper root system, are better able to obtain the phosphates from the soil.

The system of growing catch crops of bulky fodder and ploughing them under while adding no ash constituent to the soil, is very valuable for adding nitrogen when leguminous plants are used, and its other advantages have already been pointed out.

It may be considered what quantities of plant foods are removed from the soil by the growth of crops or sale of milk or stock; approximate figures are given:—

	In pounds per acre.			
	Nitrogen.	Potash.	Lime.	P_2O_5.
Oat forage—4,000 lbs. dry forage	52	46	12	20
Mealies—4½ bags grain	15	3	25	5
Mangels—20 tons roots	90	200	14	33
Red clover—2 tons hay	100	80	90	25
Milk loss per 1,000 gals.	60	17	—	20

In selling butter, nearly all this would be recovered in the separated milk.

Thus a dairy farm selling off 25,000 gallons of milk in a year would sell off 500 lbs. P_2O_5, requiring, say, 2,500 lbs. of bone meal to replace it. A stock farm selling off 500 hamels, weighing 100 lbs. live weight each, would also remove 500 lbs. P_2O_5.

In time this constant drain on the plant food in the soil must result in a deficiency of some essential element, and it is only by a judicious system of manuring that the soil can be kept in its normal fertile condition. It must not be forgotten that a farmer spending £1 on some needed manure probably gains 30s. at a later date in increase of crop due to this manure.

AGRICULTURAL SHOW DATES, 1907.

Cradock, on Tuesday and Wednesday, April 2 and 3.

Kokstad, on Tuesday and Wednesday, April 2 and 3.

Albany Agricultural Society, at Grahamstown, on Thursday and Friday, April 4 and 5.

Cape Flats Farmers' Show, Wednesday, April 3.

Elliot, on Wednesday, April 10.

Port Elizabeth, on Wednesday, Thursday, and Friday, April 10, 11, and 12.

St. Mark's Agricultural Society, at Cofimvaba, on Thursday, May 23. Postponed from March 8.

WHEAT IN CAPE COLONY.

A Report on Recent Experiments.

By Dr. Eric A. Nobbs, Agricultural Assistant.

The present subordinate position of wheat growing in Cape Colony is attributable mainly to the ravages of rust. But for this terrible scourge it is quite conceivable that we might be able to supply our own needs in this respect and possibly have a surplus for exportation. The problem of overcoming the trouble has been fully and earnestly studied for many years in all countries where rust is prevalent, and without going into laborious details it may be here stated that it is now agreed that by no process of treatment of the land or the seed, by no dipping, spraying or manuring, can the disease be cured or prevented. The only procedure which has met with success has been the cultivation and propagation of rust-resistant varieties, and fortunately, along this line most gratifying results have been achieved.

In Cape Colony the position is that out of some sixty or more varieties commonly grown, and many times that number experimentally tried, only a very few have proved rust-resistant, and that in varying degrees and in different localities. Rietti wheat has, within recent years, become the most popular on this account. Its almost accidental introduction was quite providential, coming in, as it did, at a very critical juncture. Other sorts, as Medeah and Red Egyptian, are resistant under certain conditions and in limited localities only.

Efforts to combat rust are, therefore, now reduced to testing such sorts as offer reasonable prospects of resistance and to the production of new varieties. For many years past the Government has imported different sorts of wheats and distributed them amongst farmers, but hitherto without conspicuous success. Much difficulty was experienced in securing returns as to the success or otherwise of the trials, and it is largely on this account that the Colony is now overburdened with a number of wheats known only by local names, such as Rooi, Wit, Klein, Spring, Kaalkop, Swaart aar, Square aar, and so on, or called after individuals, Van Niekerk's, Du Toit's, Du Plessis's, Fourie's, Strijdom's, etc.

It is a disadvantage of our wheat crops that in every district several sorts of wheat are found, and the names are even more numerous than the kinds, while sometimes the same name is given in adjacent districts to different kinds, or different names to the same kind. This multiplicity of sorts damages the market considerably. Millers are not able to give as good prices for a number of different classes of wheat as they could do if several thousand bags all of the one sort were obtainable. With large stocks of even character, milling is much simplified, and consequently better prices can be given. The number of sorts to be found indicates that none were pre-eminently suitable. The rapid advance of Rietti wheat in the public esteem will prove a means of reducing this variability, and it is hoped that some of the newer sorts will, by becoming equally popular, also tend to replace inferior wheats, and so furnish the markets with large bulks of uniform character, worth more money.

The Department of Agriculture is conducting experiments with a large number of wheats, both Colonial and imported, to test their relative merits side by side, but more particularly to ascertain, under identical conditions, their respective rust-resisting powers. The production of new varieties by artificial cross fertilisation is also in progress, with a view to creating in this country a variety which it is hoped may prove more suitable than foreign kinds. Naturally, several seasons must elapse before this work can bear fruit, but it seems reasonable to expect the best results from such research, as it is along similar lines that success has been achieved in other countries.

Meantime, there is no reason to relax our efforts to secure rust-resistant wheats from abroad if possible. With this end in view, some 220 farmers were supplied last season with parcels of twenty pounds weight each of a few specially chosen wheats, which in other lands had gained great reputations for rust-resistance. The reports of these experiments have now been received in sufficient numbers to justify their publication and the expression of a general opinion regarding their respective properties and prospects. In carrying out these experiments many difficulties had to be met. In the South-Western districts after the crops were cut and tied up, farmers had the chagrin of seeing everything swept away by floods, or hopelessly spoilt by the prolonged and unprecedented rains. In the Eastern Province, locusts devoured many plots, while in the West the season was so dry as to shrivel the grain and gave no test of rust-resisting capacity, as the disease was absent from even the most susceptible sorts this season. But the chief cause of irregularity rendering valueless comparison in terms of yield was the havoc played upon the small plots ripening successively by the hosts of small birds, which in many instances took all the grain before it was ripe, particularly the beardless sorts.

In most cases only one or two wheats of sorts deserving trial were sent to each farmer, but in a few cases more comprehensive experiments were made. For some years past, Mr. Robert Starke has been endeavouring to find new sorts of wheat adapted to the Tygerberg area.

Last season on his farm, Oatlands, Mr. Starke grew eighteen distinct varieties side by side, treated and identically sown on the same day. His reports deserve, therefore, close attention, and the success of Gluyas Early and Elephant are noteworthy. In the same vicinity, Mr. Theunissen, of Langberg, Kraaifontein, has done well with Darling wheat, although even in his case it was affected with rust though not sufficiently to damage the grain. Few have devoted more attention to the question of testing varieties of wheat than Mr. H. Kotze, of Langrietvlei, in the cereal region at the mouth of Berg River, and his exhibits at Malmesbury and Rosebank received much attention and praise. At de Oude Drostdy, Tulbagh, on the farm of Dr. Beck, M.L.A., Mr. Viljoen has carried on a careful trial of several varieties of wheats and oats. Trials were also carried out on a large scale by Mr. A. Ohlson, at Ceres, and the Hon. J. D. Logan, at Tweedside, in the Karoo.

In the Midlands, Mr. E. W. Collett, of Sandfontein, Jagtpoort Siding, Middelburg, made a thorough trial of fifteen sorts where, under precisely the same conditions, the palm must be accorded to Jonathan and Elephant in a contest where all did well and the conditions were favourable.

In the following notes Rietti, as the best known, is first dealt with, the new Australian introductions are next discussed, then other imported sorts, and lastly a number of local sorts of good repute are mentioned, and so far as possible the opinions of growers given in their own words.

RIETTI WHEAT.

The chance introduction of Rietti wheat into Cape Colony some eight years ago has already been referred to as a happy accident, which enabled the cultivation of the chief of cereals to be successfully continued where otherwise it would have been brought to an end and corn farmers seriously hampered if not ruined thereby. Such occurrences must, however, not be left to chance, and provision has to be made to forestall the possible deterioration of the wheat and the risk of its taking rust, as has been the case in the past with our best and oldest favourites. This is to be done partly by the discovery of other rust-resistant varieties, partly by the continued introduction of fresh seed of Rietti wheat from its native home. Signs of deterioration are not wanting. The samples even at our shows are characterised by an increasingly mottled appearance, starchy portions occurring in the characteristically horny grain. Moreover, last season the writer saw Rietti wheat covered with the rust fungus to an extent never previously observed, and in some cases to an almost fatal degree; frequently to an injurious extent. The need of fresh seed, even of this sort, or of change of seed from one district to another, is therefore emphasised.

Rietti wheat, more accurately to be called Rieti wheat, comes from the district of that name in Northern Italy. With a view of safeguarding their own interests and at the same time ensuring to buyers, who come there from many foreign countries to procure seed of this valued sort, that they shall obtain the genuine article of guaranteed and uniform quality, the farmers of Rieti have formed a co-operative society, the "Unione Produttori grano da seme, Rieti," for the sale under seal of true Rieti wheat. This is a great boon to buyers at a distance. It is obviously to the advantage of the society of growers of Rieti seed wheat to deal only in the real article and to maintain and improve the quality of the wheat for which the district has a world-wide reputation. A specialist has been appointed to investigate and study this variety with a view to further improvement. This co-operative society consists of two hundred members, the seed of small farms is bulked and made into one uniform sample, and a fixed standard of quality is secured. A prize, consisting of a golden ear of wheat, is annually awarded to the grower of the best sample. Rigid rules for the improvement of the existing sort by selection and for the prevention of fraud are enforced. The quality of the wheat of Rieti is thus maintained and improved.

A small quantity of Rietti wheat was imported and distributed last season, and twenty reports have been received. In some cases the variety was not new to the locality, and in such instances the experimenters report it as good and usually better than the old seed. To those to whom the variety was new it seems to have given general satisfaction, though it is reported to have suffered much from rust at Hankey, Humansdorp, and its lack of resistance to drought and lateness are adversely criticised. This was the main crop sown at the Robertson Experiment Station, and the quality and yield were very satisfactory indeed.

Of the fifteen varieties grown by Mr. H. Bester, on Mr. Ohlson's farms at Ceres, Rietti proved the best, and is well suited to that locality. Rietti is reported to be equally as good as the old local favourite Wonder Koorn, the origin of which, as with so many others, is lost. It is interesting to note that in experiments carried on by the Agricultural Department of the Transvaal, Rietti has proved valueless for that Colony, dying off from rust when only a few inches high.

Official reports from the Orange River Colony are also against this sort, and on the same grounds. Our fears for the future are strengthened by these facts.

In Australia, one of the world's greatest wheat producing countries, the same problems which face us to-day have had to be coped with. To this end, the production of good rust-resistant wheat, adapted to various localities and a variety of climatic and telluric conditions, the late George Farrer devoted many years of his life. His work was necessarily slow, and was only latterly recognised and assisted by the Government of New South Wales. Recently the fruits of his labour in the form of fixed types of new sorts produced artificially by processes of hybridization have become widely known and their merits recognised. Of these, certain sorts are reputed specially rust-resistant, notably Darling, Gluyas, Budd's Early and Jonathan. The first of these has now been under trial for two years in this Colony; the others have only been obtainable this year. In view of the good reputation of the wheats a large number of experiments were made, the results of which are now made public.

DARLING WHEAT.

Darling wheat (Bobs) has now been under trial for two years in Cape Colony. As regards yield and quality of grain it is one of the most beautiful of all wheats, and makes delicious bread. Many growers speak with enthusiasm of its merits. In Australia it is regarded as rust-resistant, and as one of the best of the new wheats. Upwards of ninety reports upon this variety have been received, and exactly one-half speak very highly of the wheat. Unhappily, almost all the remainder state that it was partially or entirely destroyed by rust, thus conclusively condemning it for this Colony. In spite of its otherwise desirable properties, Darling wheat cannot be recommended even for further trial. The risk is too great. Perhaps it may continue to be grown by some of those who have been successful with it, but it would be wiser to grow less doubtful sorts. This announcement will be a disappointment to many, but may serve to prevent greater disappointment and loss in the future. The reports are too numerous to publish, but the verdict is decisive.

GLUYAS EARLY WHEAT.

Gluyas Early wheat has won for itself much enthusiastic praise, and there can be no doubt that this wheat will become one of our standard varieties. The consensus of opinion is strongly in its favour, yet occasionally rust is reported, and to a serious extent. This is most unfortunate, as it has not been known to take rust in New South Wales, and is there regarded as immune.

In so far the results correspond to those of Darling wheat, but much of the rust did no harm, attacking leaf and stem only, and too late in the season to damage the grain. This was the case at both experiment stations, where the disease was undoubtedly present, but not to a harmful extent. It seems that early sowing is to be advised in this case, although the converse is advised by at least one experimenter—Mr. Theunissen, of Langberg. Rust is reported even from the inland districts Graaff-Reinet, Fort Beaufort, Worcester and Montagu, while it was clean in districts like Port Elizabeth, Swellendam, Caledon, Piquetberg, and at Hankey, where the grower, Mr. C. W.

Rademeyer, reports rust even on Rietti. These curious results warn us to be careful, but the balance of evidence remains strongly in favour of this new variety.

The reports repeatedly recommend early and thick sowing as the wheat does not stool freely. Like other hard wheats, it will necessitate care in milling. Special attention may be called to the reports of Messrs. R. Starke, Theunissen, Wolhuter and Kotze in its favour, and of Messrs. Kingwill and Story to the contrary.

In view of the importance of this new sort, the reports received, numbering close on fifty, are attached:—

Caledon (Mr. P. Neethling). Sown 15th June, 1906. Result: Good. Answers splendidly in this district, and will pay well.

Caledon, Houw Hoek (Mr. J. A. Beyers). Sown 10th July, 1906. Result: Bad. Unsuitable to district. Attacked by rust very badly about 10th November.

Piquetberg (Messrs. Liebenberg Bros.) Sown 25th May. Result: Good. This variety is a soft white wheat, and ought to be well adapted for milling purposes. With reference to rust, we are not in a position to say whether it is rust-resistant or not, as all our crops were free of rust this season.

Piquetberg (Mr. A. C. Brink). No date given. Result: Good. The most suitable wheat for this district. Considering drought in September, October and November, it is very good.

Malmesbury, Darling (Mr. H. Duckitt). Sown, 4th June. Result: Fair. I find it is a wheat that does not spread, and can be sown thick. Suitable to district, and should pay.

Malmesbury, Hopefield (Mr. A. H. Kotze). Sown 1st June, 1906. Result: Good. This is the heaviest wheat that I have ever sown, and grows fine, higher than any of the other samples. Does not care either for drought or weeds. I should like to see it grow if we had a good season. The return would have been more than the others, but, unfortunately, two pigs got into the ground where sown, and destroyed almost the whole lot. I consider it very suitable in this district.

Darling (Mr. Fred Duckitt). Sown 28th May, 1906. Result: Bad. Sown thinly and broadcast on unirrigated land. Reaped 23rd November, 1906. Yield, 80 lbs. Weather, dry. Applied farmyard manure. It is worth a second trial. I do not think it will pay here.

Darling (Mr. N. Besthier). Sown 29th May, 1906. Result: Good. Hand sown on unirrigated land. Harrowed. Reaped 10th December. Yield, 75 lbs. Weather very dry, with exception of August, and very warm. Applied 75 lbs. Superphosphate. My opinion is that this wheat thrives better and is longer than Rietti wheat, and matures a month earlier. I consider it suitable to district, and will pay.

Darling (Mr. J. V. Duckitt). Sown 26th May. Result: Excellent. Sown thinly and broadcast on well fallowed land: grain was ploughed under and harrowed well. Consider early for district.

Darling (Mr. M. Versfeld). Sown 29th May. Result: Good. Sown thinly and broadcast on unirrigated land. Reaped 20th November. Yield, 130 lbs. Weather very dry, with a little rain. Applied 350 lbs. Thomas phosphate. I think it a good wheat, about a fortnight earlier than Rietti, and I did not see a single speck of rust on it, although Rietti, standing alongside, had spots of rust on straw. If the wheat is really rust-resistant it will turn out a splendid wheat. I kept the yield to sow again, and will be able to report on it again this year.

Darling (Mr. W. van Niekerk). Sown 19th May, 1906. Result: Indifferent. The production poorer than the experimental seed, which I think can be put down to dryness of season. Should pay according to what the other varieties have yielded.

Durbanville (Mr. Robert Starke). Sown 20th June, 1906. Result: Excellent. Sown broadcast on unirrigated land rather late. Reaped 5th December. Yield, 730 lbs. in straw, 345 lbs. in grain. Weather very dry. Applied 23 lbs. Government guano. Is suitable to district, and will pay very well. I found it the best and earliest of all plots. One of the grandest growing wheats I have seen. Beardless, with reddish glazed, full, hard straw. Stands up well. Stood from 14 to 18 days after ripe. Did not shell or fall over.

Paarl (Mr. S. G. du Toit). Sown early in June; reaped in mid-November. Result: Good. Treated with a light dressing of kraal manure. Gluyas is one of the best wheats I have tried. Yield, 600 lbs. from 20 lbs. seed. Though sown late, it was cut ten days before any other wheat. If it will keep rust-proof I would highly recommend it to our district.

Kraaifontein (Mr. H. Theunissen, Junr.) Sown 31st May, 1906. Result: Good. Sown thickly and broadcast on unirrigated soil. Ploughed and harrowed. Reaped 19th November. Yield, 600 lbs. The weather was good at first, but too dry towards the end. Applied 80 lbs. Government guano and a little kraal manure. I must say the Darling and Rietti wheats took rust in straw, and the Gluyas wheat did not. Farmers must take care not to sow this wheat too early, because when flowering it may be too cold in September, the right time for sowing being the end of May. The wheat gives good meal and bread; only the miller says the wheat grinds like gravel in the mill, though its bread is preferable to that from Rietti wheat. I consider it suitable for the district, and if not attacked by rust will pay.

Bredasdorp (Mr. P. K. Albertyn). No date given. Result: Fair. Stands drought very well. Crops improved wonderfully after the last rains. The crop is fair.

Bredasdorp (Mr. F. J. P. du Toit). No date given. Result: Moderate. A failure owing to dry season. Rains too late to do any good. Both Gluyas and Darling thrived well. Very healthy, and no sign of rust shewn.

Bredasdorp (Mr. P. G. Myburgh). Sown 15th June, 1906. Result: Good. Sown broadcast on irrigated land. Weather very dry up till October. I think it is suitable to district, and will pay to cultivate.

Bredasdorp (Dr. W. Myburgh). Sown end of July. Result: Good. Well adapted to our district. Very healthy considering dry season. Has a fine ear and a good grain. With fair rains will give good results.

Bredasdorp (Mr. H. H. van Breda). Sown 15th July. Result: Fair. Considering the extremely dry winter, the yield is not bad. Attacked by "ladybirds" in a mild form when ears were forming.

Bredasdorp (Mr. P. K. Albertyn). Sown 18th May. Result: Bad. Not suitable for district. All my crops suffered from drought. Attacked by Honing Dauw.

Bredasdorp (Mr. J. P. Matthee). Sown 25th July, 1906. Result: Good. Considering late season sown and drought, I think it fairly suitable for district. If sown earlier and plenty of rain it will pay. Yield, 150 lbs.

Bredasdorp (Mr. H. C. Goldie). Sown 3rd July, 1906. Result: Good. Very good grower, little rust, and makes fine bread. Suitable, and will pay in this district.

Bredasdorp (Mr. O. E. Scheuvel). Sown July, 1906. Result: Good. Suitable for this district as far as yield goes. Slight rust in straw only. Unsuitable to be cut by machinery, and the straw is very weak and thin, the weight of ear causing it to bend over.

Swellendam (Mr. J. P. Eksteen). Sown 26th July. Result: Very good. Grows splendidly and very fast. Sow late on irrigated soil. Free from rust. Must not sow before July. Everyone is struck with its growth.

Swellendam (Mr. C. F. Rigg). Sown early July. Result: Good.

Swellendam (Mr. Donald Moodie). Sown 5th June. Result: Good. Reaped in second week of November. A good deal of rust on the stalk, but this did not seem to affect the grain. As rust seldom appears here before November, I believe that if sown a month earlier it will be a valuable crop. Unfortunately, the floods caused considerable loss, but I cleaned out about 250 lbs. from 20 lbs. sown.

Riversdale (Mr. J. B. Nel). Sown 15th June. Result: Good. The soil need not be rich for sowing this wheat. It grows well. I intend sowing same on better soil, and will report again. I noticed rust at the beginning of December, but it did not damage the wheat. Very suitable for district if the rust goes no further.

Heidelberg (Mr. Hans Gildenhuijs). Sown June. Result: Good. Crop was damaged with the flood 17th December. Decidedly suitable for this district, and undoubtedly will pay.

Ashton, Malmesbury (Mr. G. F. Malherbe). Sown July. Result: Indifferent. Taken by rust in October. Not so good as Jonathan. Suitable on the Karoo side of Ashton.

Robertson (Mr. C. R. Wolhuter). Sown 16th July. Result: Good. I am very much in favour of cultivating this grain, and think it will pay well. Soil in general in Robertson district is quite suitable without treatment. The corn is very healthy, and thrives well considering the drought which prevailed during the earlier stages. The grain is nice and full, commonly known as "fat." I am saving the crop to try it on a slightly different soil next season. As none of my other corn took rust, I cannot say whether the Gluyas is rust-resisting.

Robertson (Mr. C. P. Klopper). Sown 4th May. Reaped 22nd November. Result: Good. 20 lbs. seed sown on a half morgen Karoo ground under irrigation with no manure; yield, 700 lbs. grain. Very slightly damaged by rust before ripening. I am of opinion that this grain would answer better on poorer ground than that used by me.

Montagu (Mr. F. D. du Toit). Sown 31st May. Result: Poor. Not suitable. The ear is too short and thin, so it is never possible to yield a good crop. Slight rust at the end.

Ceres (Mr. A. Ohlsson). Sown 8th June. Reaped 8th December. Result: Good. 200 lbs. guano per acre on unirrigated lands. Slight rust after flowering. It grew well, and is a good sample for the market; if it can be sown early on good brak-land I am sure it will do well.

Worcester (Mr. H. A. Viljoen). Sown 20th July. Result: Fair. A better result if sown a month earlier. During the first half of period during season very warm and dry. Slightly rusty. I consider it suitable for district.

Hermon (Mr. J. A. Louw). Sown 24th May. Result: Fair. I think it is suitable for district, and would pay. Being a very wet season, difficult to say if it is rust-proof.

French Hoek (Mr. P. J. Verster). Sown 5th June. Result: Indifferent. Do not consider it suitable to this district.

Knysna (Mr. J. J. Hooper). Sown end of June. Result: Excellent. I think it an excellent wheat for this farm, owing to its being quite free from rust, etc. Its rapid growth and prolific yield I was very pleased with. Ripened nearly a month before Rietti or Darling wheats.

Knysna (Mr. E. Bibbey). Sown 11th June. Result: Fair. Sown broadcast on unirrigated land. Reaped about 25th November. Yield, about ten for one. Weather very good. Applied a little guano on seed before sowing. I consider it suitable for district, and will pay moderately. Crop, light according to my idea.

Hankey (Mr. C. W. Rademeyer). Sown 4th July. Result: Good. This variety I really like best on account of its resisting qualities, and is the earliest of all wheats. Very suitable, and will pay. If I had watered it in October when dry weather set in, I should have had a better yield.

Graaff Reinet (Mr. R. P. Kingwill). Sown 6th August. Result: Bad. Entirely destroyed by rust as soon as ears were fairly out.

Fort Beaufort (Mr. Colin Story). Sown 14th August. Result: Poor. Wheat was very badly thrashed, consequently the yield given is not a fair one. The grain falls considerably below the seed sent; owing to the rust, it lacks plumpness and colour. Rietti wheat, sown alongside, was unaffected by rust. Gluyas was sown nineteen days after Rietti, and reaped sixteen days earlier. From flowering to reaping occupied only thirty days. Rust appeared beginning of November, before flowering stage, and steadily increased till leaf, stem and ear were affected.

Aliwal North (Mr. C. G. Hards). Sown 31st May. Result: Poor. This wheat and the Rietti I do not care for. The former gives a very small ear; the latter a decent ear, but beats out with every wind. It may be that if the Gluyas was sown earlier better results would follow.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown 23rd May, 14th June. Result: Fair. All grain was sown in two parts; that sown in May in sandy soil, and that in June in clay soil. Had the order of sowing been reversed a better result would have been obtained. In every case that sown in June was the best. I consider it suitable for district, and will pay under ordinary conditions.

Stellenbosch (Mr. James Rattray). Result: Good. Sowed in June on a pilloide soil of not rich quality, with a thin dressing of kraal manure. No rust. Did splendidly. Suffered slightly from the drought. I give the preference to Gluyas, and will sow a larger quantity this year.

Stellenbosch (Mr. A. Kennedy). Sown 21st June. Result: Very good. Sown broadcast on unirrigated soil. Crop well liked. Should be sown again. As yet have not milled any.

Sterkstroom (Mr. Isaac Bosman). Sown 20th June. Result: Good. Very suitable for district, and will pay. Stands drought well. Is in full ear now. Hope to get 100 sheaves—200 lbs. corn. Unfortunately hailstorm destroyed corn.

Port Elizabeth (Mr. W. I. Reed). No date given. Result: Very good. This variety is rust-proof in my opinion, and is suitable to district.

Peddie (Mr. W. H. Stirk). Sown 15th July. Result: Bad. Grew splendidly until it came into head. At the blossom stage there was a little rust on stalk, but I thought it wouldn't hurt. Quite expected a good yield, but in about a week it all fell down to the ground, and I didn't get a grain.

Clanwilliam (Mr. C. P. van der Merwe). Sown 25th May. Result: Bad. Sown thinly and broadcast on unirrigated land. Reaped 25th November. Yield, 200 lbs. Weather, warm and dry. I don't think it will pay, as it is not suitable to district. Ears are small. Might have done better with more rain.

Swellendam (Mr. H. Swarts). Sown 3rd June. Result: Good. Sown thinly, broadcast, on unirrigated land. Reaped middle of December. Yield, 250 lbs. Weather, dry. Applied goat manure. I consider this wheat suitable to our climate. As regards rust, last season being a very dry one, and rust is usually prevalent in wet seasons, I am unable to give an opinion. I should say it will pay in this district.

George (Mr. Francis Robertson). Sown 17th July. Result: Bad. Sown broadcast on unirrigated land. Reaped 10th December. Yield, 180 lbs. Weather: Enough rain, but generally very bad for rust. I do not consider this district suitable, as the soil is not rich enough, Gluyas being a delicate wheat and wants very good soil and a drier climate. I think this wheat is more adapted to the Karoo districts, as it has a heavy grain and a very delicate straw. The straw cracks, and the ear falls to the ground, which is on account of the dampness of the climate. Should be sown fairly thick, as it does not stool much.

Tulbagh (Dr. Beck and Mr. W. J. Viljoen). Sown 23rd June. Reaped in the middle of November. Result: Good. Much in advance of Darling and Jonathan, both of which were killed by rust. Rust attacked Gluyas wheat in September, but it recovered, and yielded well. I am sure this wheat will turn out well if it withstands disease. It gives a beautiful white flour, and is early in the market, and does not drop the grain in handling.

Cathcart (Mr. C. C. Miller). Sown 5th June. Reaped in January. Result: Good. No rust, though the season was very wet. This wheat produces a lovely flour, and makes fine bread.

JONATHAN WHEAT.

Jonathan wheat, also one of Farrer's Australian rust-resistant varieties, deserves our closest attention. In most instances it has given excellent results. It seems to have succeeded at French Hoek, where other varieties under trial failed, but in Alexandria did not do as well as the old local favourite, French, which in turn failed everywhere else. It failed in good company along with Rietti and Budd's Early at Hankey, where Gluyas Early did well, rust being the cause, but in some instances is preferred even to Gluyas Early. A scrutiny of the reports is of interest:—

Hopefield (Mr. A. H. Kotze). Sown 1st June. Result: Excellent. This is a magnificent kind of wheat and a quick grower. It is something like our Du Toit's wheat, only it has a longer ear, grows longer, and can stand the drought better. I think it will answer very well on the coast lands away from the birds, which are a regular plague along the river farms. Suitable for the district where there are no birds.

Darling (Mr. Jacob van Reenen). Sown 13th May. Result: Good. I think it suitable for this district, and will pay.

Darling (Mr. Fred Duckitt). Sown 28th May. Result: Good. Sown thinly and broadcast on unirrigated land. Reaped 23rd November. Yield, 155 lbs. Weather, dry. Applied farmyard manure. Worth another trial.

Durbanville (Mr. Robert Starke). Sown 20th June. Result: Bad. Sown broadcast on unirrigated land. Reaped. 5th December. Yield, 470 lbs. in straw, 170 lbs. in grain. Weather very dry. Applied 23 lbs. Government guano. I do not consider this wheat suitable for this district. Similar to Darling wheat, ears smaller, and not well filled.

Malmesbury (Mr. H. J. Stoffberg). Sown about 20th June. Result: Good. Very suitable for district. Not much good for selling, as it is much too floury. No disease, and very excellent wheat.

Paarl (Mr. P. J. Verster). Sown, 5th June. Result: Good. Suitable to district. Yielded better than any of the other kinds of wheat with same treatment. I think if, when manuring, three bags of kraal manure ash are added to every bag of guano used, this variety will do very well.

Wellington (Mr. W. McMillan). Sown, 26th May. Result: Good. It is a very nice sample. Grows vigorously all the time. Was a fortnight earlier than Rietti. I think it would suit the district, and would pay.

Montagu (Mr. F. D. du Toit). Sown, 31st May. Result: Fair. It seems to be a very good wheat, a long ear, so that it can yield a lot. Suitable for this district, and will pay if no disease occurs later.

Ceres (Mr. A. Ohlson). Sown, 8th June. Reaped, 20th December. Result: Good. Yield, 222 lbs. from 15 lbs. sown. I think this wheat will answer well, and pay. It is hard, gives a good weight, and had no rust or other disease.

Robertson (Mr. G. F. Malherbe). Sown, 1st July. Result: Very good. Crop suitable for district, and will pay. Grew well; no signs of rust. Very good, but does not equal Rietti.

Kimberley (Mr. N. J. Botha). Sown, August. Crop died. Suitable only on carefully prepared soil. Requires lots of moisture.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 23rd May, 14th June. Result: Fair. Grew up well, but contracted "brant," otherwise would have been one of the best. Grain badly burnt. Fairly suitable for district, and will pay, but not as well as some others.

Bredasdorp (Mr. P. K. Albertyn). Sown, 17th May. Result: Fair. I think it is a good wheat; it ripens fairly early, and evidently is rust-resisting. It also stood the drought fairly well. Suffered a little from Honing Dauw and also from smut. I consider it fairly suitable for district, and will pay.

Humansdorp (Mr. C. W. Rademeyer). Sown, 4th July. Result: Bad. Not suitable for district. If sown in May, it may answer better, but if sown late, it will not pay. Destroyed by rust in October. Killed two-thirds of crop. May answer better nearer the coast on cultivated land.

Alexandria (Mr. J. C. Potgieter). Sown, 21st June. Result: Fair. I think it will do well in this district, but French wheat does much better. Attacked by honey dew. No rust.

Swellendam (Mr. H. Swart). Sown, 3rd June. Result: Fair. Sown thinly and broadcast on unirrigated land. Reaped, middle of December. Yield, 50 lbs. Weather, dry. Applied Government guano. I am of opinion that with a good season this wheat will grow and yield well in the district. I noticed no rust. The yield would have been greater, but owing to its being eaten by game it did not have a fair chance.

Tulbagh (Dr. Beck and Mr. Viljoen). Interim report.—Sown, 23rd June. Result: Fair. Moderate crop, seriously attacked by rust, but not killed.

Lower Albany (Mr. J. H. Dixon). Sown, July. Result: Bad. Not suitable to district. When coming in head, took the rust and fell to the ground.

Port Elizabeth (Mr. A. Jones). Sown, 28th May. Reaped. 30th October. Result: Good. Very early crop, but does not stool much, and the straw is weak.

Never shewed the least sign of rust, while Darling and Budd's Early wheat were severely attacked.

BUDD'S EARLY WHEAT.

Budd's Early, the last of the three new Australian wheats, gave good results in several instances, but does not seem to have answered as well as Gluyas or Jonathan. Rust has occasionally destroyed it also.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 25th May, 14th June. Result: Good. Suitable for the district, and should pay. A nice grain. Would do well in nine out of ten years in Karoo.

Hopefield (Mr. A. H. Kotze). Sown, 1st June. Result: Good. I consider it suitable if no birds are near. A good yielding wheat. Birds destroyed a good lot. A very fine grain; grows rather short. Do well in a good season, as it does not stand the drought very well.

Darling (Mr. Fred Duckitt). Sown, 28th May. Result: Indifferent. Sown thinly and broadcast on unirrigated land. Reaped, 23rd November. Yield, 156 lbs. Weather dry. Applied farmyard manure. Worth a second trial.

Paarl (Mr. S. G. du Toit). Sown about 1st June. Cut in November. Result: Indifferent. Inferior to Gluyas and Jonathan wheats. Will try it again. Yield, 450 lbs. from 20 lbs. seed.

Bredasdorp (Mr. P. K. Albertyn). Sown, 1st May. Result: Fair. I think this wheat ought to do, yet personally I would not go in for it.

Bredasdorp (Messrs. D. and W. Myburgh). Sown end of July. Result: Good. Sown broadcast on unirrigated soil. Suitable for district. Very healthy. Yield good, but sheaves damaged by heavy rains.

Caledon (Mr. A. F. Viljoen). Sown, 7th May. Result: Bad. Not suitable for district.

French Hoek (Mr. P. J. Verster). Sown, 5th June. Result: Bad. Not suitable to district. Insufficient rains.

Knysna (Mr. E. Bibbey). Sown, 11th June. Result: Bad. Sown broadcast on unirrigated land. Reaped, 15th December. Yield, 75 lbs. Weather, very good. Attacked by rust. Do not consider it suitable for district.

Durbanville (Mr. Robert Starke). Sown, 20th June. Result: Good. Sown broadcast on unirrigated land; rather late for district. Applied 23 lbs. Government guano. Reaped, 5th December. Yield, 650 lbs. in straw, 285 lbs. in grain. Weather, very dry. I consider it suitable for district, and will pay. One of the best growers. Stools well, grain good, beardless.

Oudtshoorn (Mr. O. Scholtz). Sown, 5th July. Result: Good. Sown thinly and broadcast on irrigated land; rather late for district. Reaped, 29th December. Yield, 200 lbs. Weather was generally dry. It was attacked by rust during early November. I think it will do very well for this district, and will pay, but must be sown a month earlier. I think this wheat got more or less attacked by rust from the surrounding wheat.

Ceres (Mr. A. Ohlson). Sown, 8th June. Reaped, 20th December. Result: Bad. Attacked by rust a month before ripening, and is not suitable.

Port Elizabeth (Mr. A. Jones). Sown, 28th May. Reaped, 4th December. Result: Bad. Rust appeared 24th October, after heavy rains. Not suitable.

STANDARD RED WHEAT.

The common English wheats—notable for heavy yield and excellent quality—have not proved suitable to our conditions. A newly created variety of this type—Standard Red—recommended as likely to prove rust-resistant, was, however, given a fair trial. Out of eleven reports received, only one is laudatory, and as rust was the cause of most of the failures this wheat may be dropped, and the group to which it belongs is once again condemned. Such evidence when comparing varieties is, however, not without its value.

NEW ERA WHEAT.

Similarly in the case of New Era wheat tried the previous year, while in isolated cases good results were obtained, the consensus of opinion is decidedly unfavourable.

DURUM WHEAT.

The wheat introduced under its class name of durum—of which there are many varieties—gave results striking in their difference. Mr. Theunissen, of Langberg, a careful experimenter, reports it to be destroyed by rust, while two other trials, both in coastal districts where from fifteen up to thirty for one are the usual returns, gave no less than forty for one and thirty for one as the yield. The trials reported upon at least justify further and more extended trials of this grain.

Cape (Mr. R. Starke). Sown early in July, 1905. Result: Good. A very quick grower: much earlier than Rietti.

Cape (Mr. H. Theunissen). Sown, 15th May, 1905. Result: Bad. Entirely destroyed by rust.

Mafeking (Mr. H. D. Roberts). Sown, 14th June, 1905. Result: Very good—40 lbs. from 9. Partly destroyed by birds; two weeks earlier than Wolt Koorn: a better and quicker grower than other wheats.

East London (Mr. E. W. Holdstock). Sown, 8th June, 1905. Result: Fair—60 lbs. from 25. Blighted after rain. Rust slightly. Not as good as Egyptian.

Riversdale (Mr. J. A. Nel). Sown, 15th June, 1905. Result: Very good—400 lbs. from 10. No disease. Very good against rust.

Robertson (Mr. J. Marais). Sown, 10th June, 1905. Result: Good—70 lbs. from 25. Birds destroyed wheat considerably. No rust, though Darling and other wheats here killed by same.

Albany (Mr. C. H. Currie). Sown, 14th July, 1905. Result: Good—910 lbs. from 25. Attacked by rust, but will pay, and is suitable here.

Stellenbosch (Principal, Elsenburg). Sown, 22nd July, 1905. Result: Fair. Deserving of a further trial.

ELEPHANT WHEAT.

Elephant wheat is a hybrid from a hardy American wheat and a German prolific sort produced by Professor Wohltmann, of Bonn, Germany, and recommended as likely to prove rust-resistant. It appears likely to require moisture, but under favourable conditions develops magnificent ears of the fine grain. It would seem to deserve further trial under irrigation in the Karoo or elsewhere in parts not subject to rust.

Ceres (Mr. A. Ohlson). Sown, 8th June. Harvested, 20th December. Result: Fair. No disease. A good and suitable wheat, and a good, marketable grain.

Bathurst (Mr. Harry Elliott). Sown, 5th June, 1906. Result: Bad. A failure. Attacked by rust three and a half months after sowing.

Hopefield (Mr. A. G. H. Kotze). Sown, 1st June, 1906. Seed very mouldy, so only a few sprung up. I cannot say if it is suitable for district. Don't think it will pay, as it does not spread much.

East London (Mr. J. G. Wegner). Too early to report. Only half grown. Attacked by rust.

Bredasdorp (Mr. P. K. Albertyn). Sown, 12th May, 1906. Result: Bad. Not suitable for this district. Grows too thinly, and was attacked by smut.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 23rd May and 14th June, 1906. Result: Bad. Appeared to be one of the worst of all wheats. Had severe drought. Not suitable in bad years.

Durbanville (Mr. Robert Starke). Sown, 20th June, 1906. Result: Fair. Sown broadcast on unirrigated land; late for district. Reaped, 5th December. Yield, 450 lbs. in straw, 175 lbs. in grain. Weather, very dry. Applied 23 lbs. Government guano. I consider it fairly suitable to district, and will pay. I don't think it suitable for a very dry season. Unfortunately, this plot was somewhat destroyed by a couple of pigs in early growth.

Murraysburg (Mr. P. Pienaar). Result: Good. Splendid yield on poor, sandy red Karoo ground under irrigation; of vigorous growth, and beautiful, long ears, heavy laden. I consider it the best wheat absolutely that can be grown on our soils, especially as it was late sown. The small, isolated plot was much injured by birds.

CAPE VARIETIES.

Besides these foreign and for the most part previously untried sorts, small quantities of certain Cape varieties were also tried. These were selected on account of their local reputations. None are outstandingly rust-resistant. This is specially disappointing in the case of the old favourite Golden Ball, the meal of which is held in such high esteem everywhere. The accompanying notes on the trials of these local varieties is instructive.

GOLDEN BALL WHEAT.

No wheat in the past has had the reputation enjoyed by Golden Ball, more especially for the excellence of the bread made from it. Good crops are being reaped round Post Retief, yet near the coast it has proved disappointing, and cannot be recommended for areas subject to rust. Elsewhere, however, its great virtues entitle it to continued use. Its curious disappearance from places where it was formerly known and valued has never been satisfactorily explained away, but its present habitat is circumscribed within a narrow belt.

Ceres (Mr. A. Ohlson). Sown, 8th June. Harvested, 25th December. Result: Good on well cultivated and manured ground, but poor on very wet ground. No disease. It is a very pretty wheat, and the land was very wet. I think that if sown on good soil it will answer well.

George (Mr. P. Heynes). Sown early in August. Harvested late in December. Sown on an old lucerne land, and choked by the lucerne at the commencement. The wheat is good for the district, and was formerly very popular here.

George (Mr. W. Groenewald). Sown, 28th April. Reaped, 26th December. Result: Good. Yield, eighteen for one. It is a good wheat, but will not last. In a few places, where the ground was rather wet, it had a little rust. The seed was somewhat mixed.

Hopefield (Mr. A. H. Kotze). Sown, 1st June, 1906. Result: Bad. Seed very mouldy. Very little came up, and that was bad. Can't stand drought. A few ears I raised out sample very fine. Will try again next season.

George (Mr. H. J. Raubenheimer). Sown, July, 1906. Result: Bad; disappointing. Golden Ball yielded good wheat, but not plentiful. Attacked by rust beginning of December. Will not answer in this district.

George (Mr. Jas. A. Robertson). No date given. Result: Very fair. Ripened too early. Only suited to well drained, airy places in this district on account of prevalence of rust.

George (Mr. Fred Robertson). Sown late in June. Result: Bad: a failure. Destroyed by rust. Will try it again as people in this district tell me it makes such a good bread.

George (Mr. H. P. Raubenheimer). Sown, end of May. Result: Good. Sown thinly and broadcast on unirrigated soil. Harrowed. Reaped, 1st January, 1907. Yield, 3.200 lbs. Weather, dry. Attacked by stink fly in September. I consider it very suitable for district, and will pay well to grow it.

Bredasdorp (Mr. P. K. Albertyn). Sown, 18th May, 1906. Result: Fair. It is a good, strong wheat, good yielder, and in ordinary seasons when Honing dauw does not appear. will yield well even on old land. Think it will develop rust if sown for many consecutive years here. I consider it suitable for district, and will pay.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 23rd May and 14th June, 1906. Came up well, but did not bear.

King William's Town (Mr. John Boucher). Sown, 28th September, 1906. Result: Bad. Not worth repeating. Attacked by blight when in blossom; within seven days nothing being left. Not suitable for district.

Durbanville (Mr. Robert Starke). Sown, 30th June, 1906. Result: Poor. Sown broadcast on unirrigated land. Reaped, 5th December, 1906. Yield, 370 lbs. in straw, 110 lbs. in grain. Weather very dry. Applied 23 lbs. Government guano. I don't consider this wheat suitable for district. It is very short, and suffered from drought.

Caledon (Mr. S. B. Vick). Sown, 15th May. Result: Poor. Can't judge, as it was a rather dry season, but I don't consider it will pay in this district.

Blue Wheat.

Blue Wheat, in spite of the dark bread, is highly spoken of in Albany, Peddie and Alexandria. The following opinions of it seem to indicate that it is adapted only to that locality.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 23rd May and 14th June. Result: Fair. Should suggest giving a further trial next year. One would be better able to judge under more favourable circumstances. I consider it suitable, and ought to pay in this district.

Hopefield (Mr. A. H. Kotze). Sown, 1st June, 1906. Result: Indifferent. Something like Italian. I don't think it suitable, as the farmers won't take to it. Does not stand the drought. Might answer if this is a good season.

Bredasdorp (Mr. P. K. Albertyn). Sown, 18th May, 1906. Result: Indifferent. I hardly think it suitable for district, and don't think it will pay. Attacked by smut on Honing Dauw.

Bathurst (Mr. E. J. Morley). Sown, 10th July, 1906. Result: Good. I consider this crop suited for the district, and will pay. I intend to sow all I have of this wheat again. Will pay, sown on hard soil. A little rust on leaf just before coming into head.

Durbanville (Mr. Robert Starke). Sown, 20th June, 1906. Result: Indifferent. Sown broadcast on unirrigated land. Reaped, 5th December, 1906. Yield, 640 lbs. in straw, 220 lbs. in grain. Weather, very dry. Applied 23 lbs. Government guano. I consider it moderately suitable to district, but cannot judge if it will pay.

Ceres (Mr. A. Ohlson). Sown, 8th June. Cut, 20th December. Result: Bad. Will not answer in this severe climate (Koude Bokkeveld), and takes rust readily.

Van Niekerk's Wheat.

The reports which have so far come in with regard to the wheat known as Van Niekerk's are contradictory in tone, but the fact is clear that it takes rust readily, hence whatever its other merits it is excluded from the most part of the Colony. Van Niekerk's wheat, known, though not widely grown, throughout the south-western districts, was remarkable as the fastest grower at the first, but lost this advantage later on, and did not prove the first to ripen as at the beginning seemed likely. It seems to have given satisfaction in dry localities, and this, together with its vigorous growth, should render it suitable for our colder high-lying inland regions. The following are the reports received:—

Lower Albany (Mr. J. H. Dixon). Sown, July, 1906. Will suit the district, and will pay under favourable weather. Came up well, but heavy hail storm beat it to the ground twelve days before it was ready to cut.

King William's Town (Mr. John Boucher). Sown, 28th September, 1906. Result: Bad. Attacked by rust when in blossom. In six days it was all lying down. Not worth reaping. May be suitable if sown early.

Hopefield (Mr. A. H. Kotze). Sown, 1st June 1906. Result: Good. Very suitable for district, and will pay well. It is a beautiful wheat, and admired greatly by farmers round about here. A little of it was destroyed by birds.

Bredasdorp (Mr. P. K. Albertyn). Sown, 17th May, 1906. Result: Indifferent. I don't like this wheat. Attacked by Honing dauw and smut. Not suitable for district, and don't think it will pay.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 23rd May and 14th June, 1906. Result: Good. Suitable for district, and will pay. Would do exceedingly well in good season. Yield, 14 lbs.

Durbanville (Mr. R. Starke). Sown, 20th June, 1906. Result: Good. Sown broadcast on unirrigated land about 65 lbs. to morgen. Applied from 20 to 25 lbs. Government guano. Reaped, 5th December, 1906. Yield, 625 lbs. in straw, 250 lbs. in grain. Weather, very dry. Fairly suitable to district, but don't consider it will pay very well. It is a very early wheat, and grows well, but ears are small. More straw than any of the other trial plots.

Ceres (Mr. A. Ohlson). Sown, 8th June. Cut, 20th December. Result: Very good. The best of fifteen varieties tried. The heaviest and finest sample; early, hardy, and free from rust.

KAALKOP WHEAT.

Kaalkop wheat is a variety much grown round King William's Town, and frequently met with elsewhere also. When grown alongside a number of other sorts, both on the coast and in the Karoo, it does not seem to have justified its existence.

Bredasdorp (Mr. P. K. Albertyn). Sown, 18th May. Result: Fair. It's a nice, fat-looking wheat, but I couldn't recommend it. Attacked badly by Honing Dauw. Do not think it suitable for this district.

Hopefield (Mr. A. H. Kotze). Sown, 1st June. Result: Bad. This seed was full of smut (Zwartsaad). It started growing fine, but when nearing perfection, seven-eighths were bad. The birds did not even attack it. Not suitable for this district.

Matjesfontein (The Hon. J. D. Logan). Sown, 23rd May and 14th June, 1906. Result: Poor. Severe drought. Not suitable under these conditions. No result.

Middelburg (Mr. W. E. Collett). Result: Good. Splendid on inspection when ripening.

Durbanville (Mr. R. Starke). Sown, 20th June, 1906. Result: Bad. Sown broadcast, on unirrigated land; considered late for this district. Reaped, 5th December. Yield, 360 lbs. in straw, 135 lbs. in grain. Weather very dry. Applied 23 lbs. Government guano. Don't consider it suitable to district. Very smutty, and shells. Will not pay.

Ceres (Mr. A. Ohlson). Sown, 8th June. Cut, 20th December. Result: Bad, poor and light; and should have grown better with treatment received. [illegible] disease, but not suitable.

SPRING WHEAT.

Spring wheat is found through the Midlands and East Mr. Kotze's favourable report of it under very dry conditions is noteworthy, but the proviso as regards rust is justified. At the Knysna Experiment Station this variety was badly rusted, while even at Robertson, under Karoo conditions, it had some traces of rust on it.

Ceres (Mr. A. Ohlson). Sown, 8th June. Harvested, 20th December. Result: Poor. Not suitable when compared to others. Did not do well.

Hopefield (Mr. A. H. Kotze). Sown, 1st June, 1906. Result: Good. A very fine wheat; a little dark in colour; stands drought very well. If it will only resist rust it should take the place of Rietti, as the latter is too late for our district, and the birds are mad after it. Birds do not seem to care for Spring wheat.

Bredasdorp (Mr. P. K. Albertyn). Sown, 18th May. Result: Indifferent. Not suitable, and will not pay in this district.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 23rd May and 14th June, 1906. Result: Indifferent. Think it ought to do in district, and should pay. Few grew in sandy soil. That sown in May a failure.

Middelburg (Mr. W. E. Collett). Result: Poor. Very late and thin crop; poor as compared to other sorts.

Durbanville (Mr. Robert Starke). Sown, 20th June, 1906. Result: Bad. Sown broadcast on unirrigated soil. Reaped, 5th December. Yield, 400 lbs. in straw, 110 lbs. in grain. Applied Government guano, 23 lbs. Very smutty, and shells. Not suitable to district.

Lower Albany (Mr. W. N. Emslie). Sown, 3rd August. Harvested, 11th January. Result: Good. Yield, 346 lbs. from 12 lbs. sown. Slight smut. I shall sow it again, as I consider it suited to the district.

FRENCH WHEAT.

French is the name given in Alexandria, Bathurst and Peddie to a wheat introduced there many years ago, perhaps of French origin, but the proper name of which is lost. It appears to be liked where known, as enquiries have been repeatedly made to the Department for fresh seed of this sort, but, of course, for lack of the true name, without avail. Reports from other wheat-growing districts, like Malmesbury, Ceres and Bredasdorp, are against it. Mr. Kotze, Hopefield, writes: "I have not much faith in this wheat. It cannot stand drought, and is attacked by smut." It is favourably reported upon from Lower Albany.

Under the circumstances this wheat might with advantage be replaced by other kinds.

DUMBLETON'S WHEAT.

Similarly in the case of a wheat of unknown origin grown very successfully for some years by Mr. Dumbleton in the George District. It has been tried at Bathurst by Mr. Estment, who reports: "Mr.

Dumbleton's wheat was attacked very badly by rust early in September, and was quite useless in November. It is unsuitable to this district, as it was sown on the same land as Rietti, which will yield twenty-five to one, having only a little rust on leaves, and the ground was not in such good order, as for the Dumbleton."

ITALIAN WHEAT.

Italian is also a wheat grown along the south-east coast, of which the proper name is lost in obscurity. The following reports do not indicate that this wheat deserves special encouragement; in fact, it might with advantage give place to better sorts.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 23rd May and 14th June. Result: Fair. Grain seems as if it ought to do well. Grew up well, but did not stand as it should have.

Hopefield (Mr. A. H. Kotze). Sown, 1st June, 1906. Result: Indifferent. A wheat not much cared for. Might as well sow rye as Italian, they are brother and sister. Not suitable to the district.

Ceres (Mr. A. Ohlson). Result: Poor I do not think it will answer. The flour is of a dark colour.

Lower Albany (Mr. W. N. Emslie). Sown, 3rd August. Reaped, 3rd January. Result: Fair. This being a very wet season, it grew rank and leafy on rich ground, and was touched with rust. It will be sown again next year. I consider it suitable for this district, and will pay.

Bredasdorp (Mr. P. K. Albertyn). Sown, 18th May, 1906. Result: Fair. I should say it would answer here. It grows thin, therefore advisable to sow rather thick.

Durbanville (Mr. Robert Starke). Sown, 20th June, 1906. Result: Bad. Sown broadcast on unirrigated land. Reaped, 5th December, 1906. Yield, 350 lbs. in straw, 115 lbs. in grain. Weather, very dry. Applied 23 lbs. Government guano. Not suitable to district. Rather mixed; appears to be three or four sorts.

WHITE WHEAT.

White wheat from the Midlands and Eastern Province is probably of Australian origin, though its original name cannot now be traced. The attached reports bear out the well known facts that in our coastal districts resistance to rust is the first essential, and that soft wheats are more especially liable to that disease, and hence unsuitable in what must ever be our chief bread producing areas.

Hopefield (Mr. A. H. Kotze). Sown, 1st June, 1906. Result: Good. A beautiful wheat, which stands the drought well, and will grow above weeds, etc. Suitable for district where there are no birds.

Bredasdorp (Mr. P. K. Albertyn). Sown, 17th May, 1906. Result: Bad. Not suitable for this district. We cannot use any but hard wheat near the coast; the moisture does not seem to agree with soft wheats, though in former years, I am told, nothing but fairly soft corn was sown.

Matjesfontein (The Hon. J. D. Logan, M.L.C.) Sown, 23rd May and 14th June, 1906. Result: Good. Very badly attacked by Honing Dauw and smut. Appears to be a good grain for the district, and would pay in good years.

Bathurst (Mr. E. J. Morley). Sown, 5th July, 1906. Result: Bad. Completely destroyed by rust. Not at all suitable for district, and will not pay.

Durbanville (Mr. Robert Starke). Sown, 20th June, 1906. Result: Fair. Sown late for district on unirrigated land, broadcast. Reaped, 5th December,

1906. Yield, 540 lbs. in straw, 215 lbs. in grain. Fairly suitable to district, and will pay moderately well. Good grain, a little smutty, suffered from drought.

Lower Albany (Mr. C. Malcolm Gush). Result: Bad. Grew luxuriantly and rapidly, but destroyed by rust.

Ceres (Mr. A. Ohlson). Result: Bad. Much injured by rust

AT THE EXPERIMENT STATION, ROBERTSON,

sixty-three samples of forty-five different varieties were sown under precisely identical conditions and treated the same throughout. Irrigation is necessary, and the plots were so small that acreage returns would not be reliable. The beardless varieties suffered much from the attentions of small birds; the plots, being small and ripening in succession, gave them every facility. As regards rust, even in the dry Karoo atmosphere, the fungus was detected on every plot of Rietti, though in no case seriously, while the old Colonial sorts, Bengal, Taute and Square Ear, Golden Ball, Blue Italian also, and Elephant were quite free: Gluyas, Jonathan and Darling shewed signs of rust, though they were not injured, which is perhaps a more positive proof of resistance than actual freedom, which may be accidental. Budd's Early had considerable rust. All other sorts had more or less rust, although the weather was generally unfavourable to the spread of the disease. Those shewing most were Wit, Eenbeen, Roer-Maker, Wol and Rooi.

These trials will be repeated and amplified next season.

The very early varieties were Gluyas Early, Wit, Fru baard, Wol, Roer-maker and Du Toit. Caledon Baard, Een been, Spring, Darling and Budd's may all be ranked as early, while Van Niekerk's, which shot out at first very rapidly, but later lost this advantage, and Rietti, which is at first a notoriously slow developing wheat, were the latest. This last fact is generally known, but is somewhat remarkable in that Rietti is regarded in Europe, where the growing season is shorter than with us, as being a decidedly early maturing sort.

It will be of interest to attach here a list of the names of a number of wheats growing in different parts of the Colony. No doubt, this is far from including all those grown, and the writer will be sincerely obliged to anyone who will have the kindness to furnish additional names, as also particulars regarding locality, yield, quality and origin. By this means it is hoped to secure valuable information of material benefit to corn farmers. To facilitate reference the wheats are arranged in alphabetical order, and the districts where obtained indicated.

Baard, Malmesbury; Bengal-Alcaster, Uniondale; Beitus, Riversdale; Blaue Dame, Durbanville; Blue, Albany; Boeland, Herschel; Bowkers, George; Bruin Bard, Caledon; Budd's Early (new); Bushman, Queenstown; Caledon Baard, Caledon; Californian, Worcester; Carveal, Durbanville; Darling, throughout the Colony; Delaware, Queenstown; Dumbleton's, George; Du Plessis, Uniondale; Durum (new); Du Toit, Malmesbury; Ecksteen's, throughout the Colony; Een Been, Malmesbury; Elephant, Durbanville; Essex Rivetts, Kaffraria; Field, Durbanville; French, Grahamstown; Fourie, Caledon; Fru Baard, Malmesbury;

German Kaalkop, Cathcart; Gluyas Early (new); Golden Ball, Post Retief; Handjesvol, Durbanville; Hannibal, Grahamstown; Harem's Koorn, Cradock; Italian, South Coast; Jonathan (new); Kaalkop, King William's Town; Kaffir Victoria, Uniondale; Klein Koorn, Worcester; Koort Zwart Aar, Humansdorp; Koppijs Koorn, Tarka; Longpit Victoria, Uniondale; Malmesbury-Baard, Malmesbury; Medeah (often mis-named Medium, Median, etc.), South Western Districts; New Era Wheat; Van Niekerk's Koorn, Malmesbury; Red Egyptian, Queenstown; Red Baard; Rietti (often mis-named Areta, Rita, etc.), throughout the Colony; Roermaker, Hopefield; Rooi, George; Rooi Victoria, Grahamstown; Rooi Els, Grahamstown; Sprij Aar, Humansdorp; Spring, Grahamstown; Square Ear, Uniondale; Strijdom's, Humansdorp; Swaartbaard, Grahamstown; Taute, Uniondale; Toto Wheat, Fort Beaufort; Transvaal, Uniondale; White Early, Uniondale; White Lamas, Thomas River; White Victoria, Uniondale; Wit Rooi, Tarka; Wit, throughout the Colony; Wit Baard, Caledon; Wit Wolkoorn, Durbanville; Wit Erf, Uniondale; Wonderkoorn, Piquetberg and Ceres; Zwart-Aar, Humansdorp.

It may be of interest to attach a list of addresses where those wheats which have shewn themselves more particularly desirable are obtainable:—

Rietti.—Unione Produttori grano de same, Rieti, Italy.

Gluyas, Jonathan, Budd's Early.—Messrs. D. Mills and Co., Cape Town; Messrs. Ball and Newman, P.O. Box 676, Cape Town; Messrs. Stephen, Fraser and Co., Ltd., Port Elizabeth; Mr. E. Y. Taylor, P.O. Box 993, Cape Town.

Durum.—Messrs. Vilmorin, Andrieux and Co., 4, Quai de la Megisserie, Paris, France.

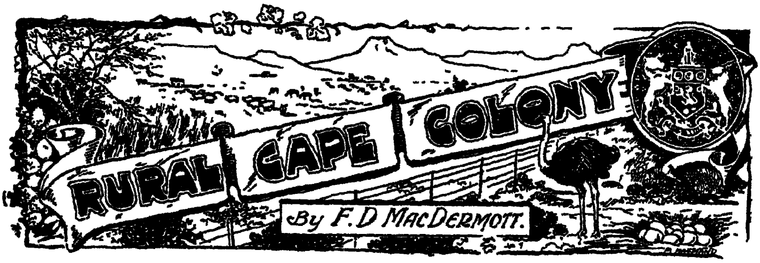
Golden Ball.—Messrs. Pringle Bros., Glen Thorn, Adelaide; and Mr. J. Sinclair, Killaloe, Post Retief.

Darling.—Mr. H. Theunissen, Langberg, Kraaifontein, Cape; and Messrs. D. Mills and Co., Cape Town.

Elephant.—Mr. R. Starke, Oatlands, Durbanville, Cape.

It is possible that certain of the views expressed may require modification when further reports are received, but in view of the approach of seed-time it was considered desirable to publish the above reports, which convey the gist of the experiments so far as we have been able to glean them. Thanks are due to those gentlemen whose watchful and laborious interest has enabled the accompanying facts to be collected. It is to be regretted that many of those who received seed have not yet reported the results of their experiments.

It is hardly necessary to call the attention of corn farmers to the extreme importance and value of the facts here presented, which speak for themselves openly.



No. XXV.

IN THE DISTRICT OF STELLENBOSCH.

The district of Stellenbosch, being one of the oldest settled sections of the Colony, has much to shew the casual visitor in the shape of cultural activity. That it is one of the most prosperous divisions in the Colony goes without saying, and that it has not by any means reached the limit of its development is another statement which calls for little labouring. In the earlier days the district relied chiefly upon the vine as the mainstay of its rural industries, which, combined with a little general farming, including cereals, laid the foundations of the agricultural prosperity which is so apparent in every part of the district to-day. It was the vine which transformed the valley in which Stellenbosch lies from an undistinguished stretch of not too rich grazing veld into one of the most attractive spots in South Africa.

The situation of the most fruitful portions of the district is very favourable for vines and orcharding, lying, as it does, in the gently sloping valleys which lead from the higher ridges of ranges like the Simonsberg, and the Hottentots' Holland. As these all gradually descend into the undulating lowlands which form the littoral of the northern portion of False Bay, they are well sheltered, and at the same time enjoy the advantages of the regular winter rainfall of the westerly and south-westerly sections of the Colony. It is this favourable position, giving a bright, dry summer, which has helped Stellenbosch to establish itself as a great fruit and vine section, and which has also been an important factor in the building up of the well-known picturesque surroundings with which most visitors to the Cape Peninsula are familiar, for Stellenbosch is one of our show sections as well as a producer.

There are so many interesting and striking features in a district like this that no difficulty is experienced in selecting subjects for an article dealing with the Rural Industries of the Colony, for one has only to alight at any of the railway stations and merely take a glance at the country side to be interested at once. The difficulty is to know what to take in hand first, and what to leave alone. Where everything teems with interest, descriptive writing becomes easy.

FARMING ACTIVITIES AT "RUSTENBERG."

Being fairly close to the village, or rather township, for Stellenbosch has grown at a great rate during the past few years, the well-known farm "Rustenberg," the home of the Barry family, may be cited as a typical instance of what this productive district is capable of in the hands of energetic and intelligent managers. There is no brand of Cape fruit that reaches the London market, which is better or more favourably known than that from "Rustenberg." It was in the early nineties that the late Sir Jacob Dirk Barry conceived the happy idea of initiating fruit growing in the Stellenbosch District for export to London, and he was one of the very first to back his opinions with his money by investing large sums, first in acquiring the beautiful farm "Rustenberg," and next in establishing the orchards of many thousands of fruit trees, which now adorn that splendid property and have since brought in consistent returns on the investment.

The Homestead "Rustenberg."

The main principles upon which this property was established were that only the best should be produced, and of that best only the carefully selected should be exported. This tradition has been maintained by the successors of the prime mover, his sons, Mr. O. E. and N. Barry, who now work the farm, and with such success that as is well known, the brand "Rustenberg" is still the guarantee in the London market of everything that is best in Cape fruit. It says a great deal for the motives which have actuated the workers on this property from the beginning, and when it is realised that this scrupulous adherence to great principle has brought in its train a degree of commercial success which has placed the whole business on an eminently sound basis, it should impress other growers for export with some sense of its importance. But the success which has been attained has had to be paid for by much hard thinking, a certain amount of disappointment and a great deal of hard methodical work. To go through the beautiful orchards to-day one would scarcely believe the number of failures which have had to be recorded. Like most new industries, the pioneers have to do the experimenting for their successors, and in this case that proportion of the work involved a good deal that was far from encouraging. The earlier efforts of the fruit growers were very severely handicapped by a want of knowledge as to the varieties of fruit most suitable and acceptable to the markets oversea. As the Barrys were among the earliest of the pioneers of the new industry they had to bear a very fair proportion of the troubles and disappointments which arose in the course of this experimentation. Now, however, the gravest of these problems are practically solved,

Fruit Packing for Export at "Rustenberg."

and the process of "working-over," a process that at one time occupied a goodly proportion of the activities of the growers has largely ceased. Not that there are not a good many varieties still marketed which are far from suitable, but with the increase in the more suitable of varieties the pressing need for immediate work of this description is passing.

"Rustenberg" itself is one of the older types of homestead which add so much to the picturesque appearance of the western districts. And like so many others, it was at one time mostly devoted to viticulture. The old cellars and outbuildings shew that the output of wine must have been something considerable before the devastation of phylloxera drove the farmers to seek for other outlets for their energies. The old cellars are now mainly used as packing rooms for the export fruits which are sent away in such large quantities throughout the season, and excellently well they answer for this purpose. Being cool, well ventilated and roomy, they allow of a great deal of work being carried on in the best of conditions.

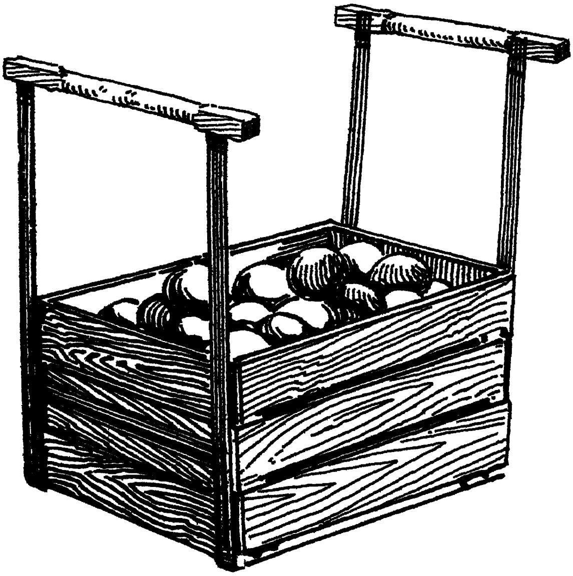
The Homestead, "Schoongezicht."

The orchards are a scene of great activity in the summer months, and the whole place seems alive with people fully occupied, but a stroll round the farm shews that it is not only at this time of the year that the orchardist has a busy time of it. Standing in the sheds one soon notes an appliance which looks like some sort of a fire-engine, but on closer acquaintance discovers that it is a power sprayer mounted on a heavy waggon. One glance at such a machine shews the amount of constant care and attention which is necessary to produce good, sound fruit. Insect pests are frequently discussed, and we hear much of the academic side of the need for their repression. If only those who have the decision of these questions could realise what it means to the commercial fruit grower, it is fairly certain that some more drastic measures would soon be introduced.

Viticulture is still a strong feature of the property, a large number of grafted vines having been planted, which are now bearing heavily. But instead of the wine being made on the farm, as in the olden days, the grapes are despatched to the Co-operative Winery, established this season near the town, where the whole products of a number of growers are handled as one vintage.

Dairying has also been a strong feature of "Rustenberg," and for some years the output of butter was something considerable. A well equipped dairy is still a necessary and active portion of the farming establishment, and a good deal has been done in the past in the way of co-operating with the smaller producers of milk and cream in the neighbourhood. At one time, Sir Jacob Barry's herd of red-polled cattle was a prominent feature on the farm, but by degrees that has fallen away. There are signs, however, of a recrudescence of interest in this side of the property for the present proprietors have laid down a fairly large paddock of paspalum grass, and intend to extend that excellent fodder as occasion offers, with the object ultimately of carrying more milk stock. This grass thrives well in this section, and as there are irrigation waters on the property, it should not be a very difficult matter to secure an extensive growth before many seasons have passed over.

While at "Rustenberg," I noticed a handy little appliance for carrying fruit boxes, sketch of which is attached. The whole thing is made with hoop iron and a couple of pieces of wood. It is both ingenious and useful.



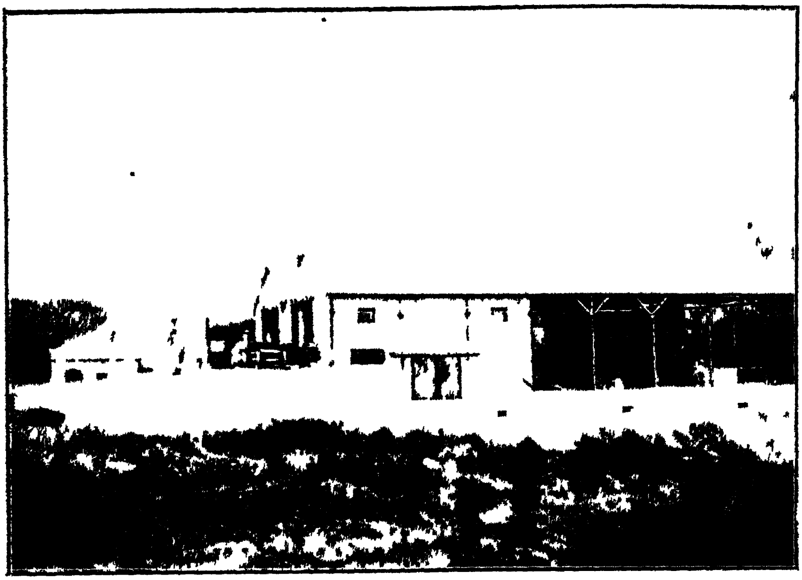
A Handy Fruit-box Carrier for the Orchard.

The Wine Cellar, "Schoongezicht."

"SCHOONGEZICHT"

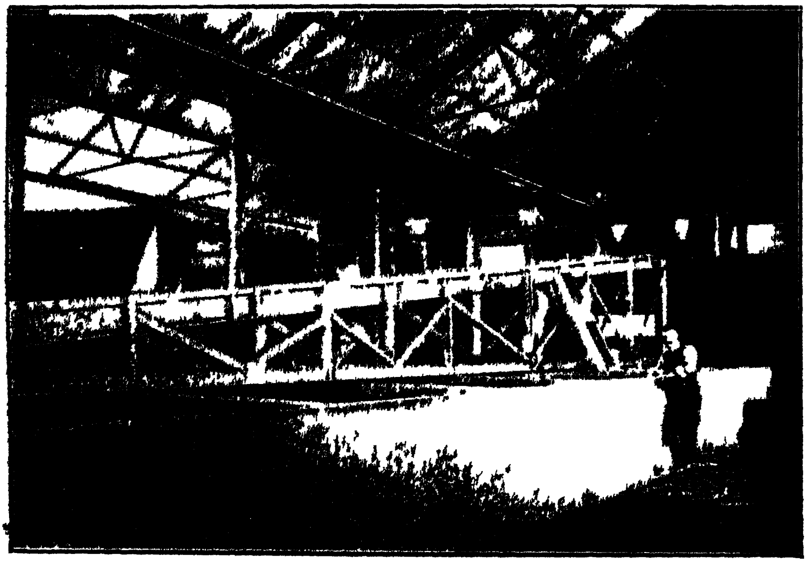
is the property adjoining "Rustenberg," and belongs to the Hon. J. X. Merriman, M.L.A., who is also one of the pioneers of the export fruit trade. The two ventures were set afloat on or about the same time, and have, to a large extent, shared more or less the fluctuations and

Packing Fruit for Export, "Schoongezicht"



Stellenbosch Co-operative Winery.

troubles which have attended the development of that industry. To-day, of course, "Schoongezicht" is in much the same advantageous position as "Rustenberg," for those responsible for its management know exactly what the markets require, and can be expected to assimilate, at the best possible rates for the producer And this



Fermenting House, Stellenbosch Co operative Winery advantage is something to have gained after so many years of labour and expensive outlay. The result is somewhat similar to what has happened in the case of "Rustenberg," the fruits going to London with the "Schoongezicht" brand always command a ready sale, and the best of prices. The cultural methods of the two properties are largely similar. The orchards are established on similar lines, and even the methods of working so closely approximate that what can be said of the one applies equally to the other. The management of this property devolves for the most part on Mr. A. Nicholson, a well known figure in fruit circles in this district. Since he has taken so active a part in it every effort has been put forward to push every side of the property, and in addition to the fresh fruit trade which is the principal item, a good deal is done in dried fruit, and viticulture is also coming to the front. Unlike the neighbouring property which sends its grapes to the Co-operative Winery, the vine harvests here are manufactured on the spot, and very excellent red and white wines of the hock and claret type are being placed on the market. Travellers in the mail trains are becoming used to the familiar brand, for it has been accepted by the Railway Refreshment Department for the supply of passengers using the dining saloons. The cellars are not very large, and so far the output has not been very great, but there is quite sufficient to establish a "mark" if the quality be maintained.

The homestead and cellars are most beautifully situated, as can be seen by the illustrations herewith. The gardens, orchards and vineyards, with their background of magnificent oaks, are in themselves a sight worth seeing, and when it is realised that all this beauty is in reality subservient to an industrial activity which is sufficiently profitable to make it well worth while looking upon the whole concern as a sound business proposition one begins to wonder what possible attractions could ever tempt anyone to turn their backs on such ideal conditions.

The Stellenbosch Co-operative Winery.

The Stellenbosch Co-operative Winery is one of the youngest of the central wineries which have come into existence in consequence of the Government policy of financial assistance to the co-operative movement in agriculture. Situated quite close to the railway station at Stellenbosch, say, within ten minutes' easy walk, it occupies a very central position for the delivery of grapes and the distribution of the manufactured produce when ready for market. The company has a capital of £10,000, and the winery is built on a portion of Mr. T. Micklem's farm, that gentleman being a prominent mover in the concern, and active in its management. The outward appearance of the buildings is quite unique. Instead of the usual solid walls enclosing fermenting house and cellar, we have here the novel plan introduced of leaving the fermenting tanks open to the fullest possible currents of air, while the cellars are built in the side of the hill below the fermenting house. The main portion of the building and the cellar sunk in the side of the hill is constructed of brick and cement, the fermenting house forming an upper storey, as it were, to the cellar. The loading platform of the fermenting house is on a level with the main road, so that the waggons with the grapes can drive right alongside and deliver almost on to the scales, and from there to the egrappoir, while pressing is proceeding. The crushing machinery stands on a platform some distance above the floor level of the fermenting house, and the crushed residues of the grapes are run down to the cement fermenting vats by means of wooden chutes. On the one side the green grapes are handled, and on the other the red. We thus have all the usual labour saving appliances of a modern winery, everything running as nearly automatic as possible, and gravitation being used to replace labour.

But the most striking feature of the Stellenbosch Winery is the fact that the fermenting vats are only covered by an iron roof, and the whole of that part of the building in which they are built is open on three sides. The roof stands on iron columns. The idea of the designer, Mr. Dubois, was, we understand, to get as much fresh, cool air blowing across the vats during the process of fermentation as possible, and in this it undoubtedly succeeds. But when the sun is low on the horizon, in the early morning or late in the afternoon, it is found necessary to hang sails up to keep the rays off the vats. This may be remedied as more experience is gained, but it seems strange that the principle should come to be introduced so late in the history of wine-making. So far it seems to act successfully, for on the occasion of my visit in the height of the pressing season everything was going very smoothly, and Dr. Perold, who was there superintending the vintage on behalf of the Government, seemed to think that it would answer well. Of course, the whole place could be bricked up at slight cost if it is found to be injurious to the wine, so that the experiment is not a serious matter. The storage capacity is estimated at 1,200 leaguers, and the cellars are well stocked with fustage of the latest design.

The "Dop" Press.

In addition to the winery

the company has erected a cool store for the service of the surrounding farmers, and this has proved of great service in many ways. The whole of the machinery is driven from one power installation, a producer gas plant with a 12 h.p. engine. In the course of conversation Mr. Micklem spoke in the highest terms of this plant, which he shewed gave power at an absurdly low figure. The whole installation works remarkably smoothly.

SUN STROKE, OR "DOM ZIEKTE" IN SHEEP.

Mr. W. B. Collins, of Uitspanfontein, Beaufort West, wrote asking for information as to a disease called "Dom Ziekte," which is prevalent in that district. He said: "Several of us have lost stock, *i.e.*, sheep, from this disease during the last month. It seems only to attack udder ewes and ewes with lambs from one to six days old. We have up to now treated the diseased animals with two ounces of Epsom Salts, and if the dose is given at the first appearance of the disease, the animal generally gets through quickly. I would very much like to know the cause of this disease, and the best and simplest treatment. A change of veld where possible we find beneficial.

"My own experience is that on the morning of the 17th February I rode over to count my sheep and found eight of them sick. They were simply standing with their heads down and chewing, or, I should say, grinding their teeth. Later in the day they seemed to get better, and grazed, but at about 2 p.m. they seemed quite stupid, and fell about all over the place, also some of them were trembling all over, and again gnashing their teeth. I had them all brought down to the garden, and at 4 p.m. gave them each two ounces of Epsom Salts. At 7 p.m., five of the ewes were grazing in the young lucerne; the remaining three were those that had the disease worst. They were still trembling and staggering about. I gave them each a pint of meal water. The next morning they were all better. I left them in the garden for the 18th, and on the 19th took them back to the flock, first giving each a distinguishing tar mark. I found thirteen more sheep sick, and gave them the same treatment as the above, with the same result. The sick sheep were all ewes about to lamb. On the 21st, I found ten more sick sheep with the flock, and amongst the ten were two of those that I had treated first. As soon as I saw this, I made arrangements for another piece of veld, and on the 25th, moved the flock. since when I have not had any more sick. Altogether I have had fifty-two sheep sick, and have lost one. I had no thermometer, so can tell you nothing about temperature. In giving the sheep the salts, I had difficulty in opening the mouth to insert the funnel. Some of the worst brought up some yellowish scum to the mouth. and it stuck round their lips.

Mr. D. Hutcheon, Director of Agriculture, supplies the following memo. on the above:—I have carefully read Mr. Collins's letter describing the peculiar disease prevalent amongst his own and some of the neighbouring farmers' sheep: I have also had the benefit of a personal interview with Mr. Collins, at which Mr. Borthwick, C.V.S., was present, and at which one or two points relating to the veld, that are not referred to in Mr. Collins's letter, were discussed. Mr. Borthwick and I are of opinion that the main cause of the disease is sunstroke, to which sheep are liable, and the reason why ewes which are close to lambing—or soon after—are most liable to become affected, is because they are more liable to become fatigued and depressed by the heat than dry stock, which would be in a more vigorous and active condition. Death, under such circumstances usually occurs from failure of the heart's action. At our interview, Mr. Collins informed us that these sheep had previously grazed on "Sweet Veld," but were transferred to sour veld sometime previous to the outbreak of the disease, and he gave several instances where other sheep farmers had experienced similar outbreaks of the disease after changing their flocks from sweet to sour veld. We are of opinion, however, that the history of these outbreaks does not point to any directly poisonous or nervous irritant plant which the sheep eat, but to the general effect on the digestive organs which such a change from sweet to sour veld would produce.

The vegetation of sweet veld contains a much larger proportion of saline constituents than the vegetation of sour veld, and the sudden cessation of such constituents in the food would tend to induce a drier condition of the food in the stomachs and a more or less constipated condition of the bowels. In fact, any derangement of the digestive organs, especially of a congestive character, would act as a contributory cause of sunstroke if the sheep are concurrently exposed to great heat in the open veld.

The treatment adopted by Mr. Collins is on rational lines, and may be briefly summarised as follows:—"Remove the sheep quietly to a cool and shaded place—a well ventilated shed, or Kafir-hut being the best—pour cold water over the head and neck, and administer a dose of purgative medicine. We do not recommend the administration of gruel, even if the sheep should refuse to feed for twenty-four hours, or longer. The appetite will return when the bowels have acted, and the brain disturbance is removed. Allow the sick animals to remain perfectly quiet, and when the appetite returns, let them have green laxative food, such as Mr. Collins provided. The value of a small patch of lucerne under such circumstances, cannot be estimated. The recovered sheep should, if possible, be shielded from the hot sun for some time during the middle of the day. In fact, it would be of immense benefit if all the flocks of sheep could be provided with shade during the extreme hot weather.

Assuming that our diagnosis is correct, it would be interesting to know what the registered temperature is during the time when this disease assumes an epidemic form; also whether the atmosphere was muggy as well as warm.

With respect to dosing the whole flock when this disease appears, we have no doubt that a purgative dose of Epsom Salts would exercise a beneficial effect in arresting the disease for a short time, more especially if the sheep could be given a little shade during the heat of the day. Further, taking the question of the greater prevalence of the disease on sour veld into consideration, we would recommend that when a change from sweet to sour veld is made, the flocks should be given a liberal allowance of equal proportions of common salt and "Loog-As" as a lick.

THE FARMERS' CONGRESS.

Minutes of the Proceedings of the Annual Meeting of the Central Association, held at Oudtshoorn, beginning Tuesday, the 12th day of March, 1907.

Congress assembled in the Town Hall, at 10 a.m., Mr. W. H. Hockly (President) in the chair.

WELCOME.

Mr. E. T. Edmeades, on behalf of the local Farmers' Association, and as the President of that Association, extended a hearty and cordial welcome to Congress.

The President acknowledged the welcome.

DELEGATES.

The Secretary (Mr. T. C. Hall) then called the roll of delegates, when the following answered to their names:—

W. B. Cumming (Albert), Steph. Smith (Bathurst West), M. T. de Jager and D. G. de Villiers (Beaufort West), W. H. Hockly, T. C. Hall, and O. E. G. Evans (Bedford), T. C. Hall (Bolo), Rich. F. Weir (Bolotwa), J. M. Gush (Central Albany), H. G. Collett, B. J. Verster, and E. G. Christian (Cradock), H. G. V. Waldeck (Colesberg), Gen. Sir E. Y. Brabant, M.L.A. (East London), L. J. Roberts (Fort Beaufort), C. Robertson and Peter Heynes (George), A. Gunning, H. L. Aucamp, and J. Adams (Griqualand West, Kimberley), C. E. Dell (King William's Town), J. Flanagan and W. Edmonds (Komgha), A. W. Douglass (Koonap Heights), G. F. Joubert (Lady Grey), T. Lanham (Langberg), P. J. Goosen (Mafeking), E. T. Gilfillan and J. M. Bowker (Midlands), A. Francis and J. Rehbok (Molteno), E. J. Edmeades, J. H. Schoeman, M.L.A., and A. H. Mulder (Oudtshoorn), J. F. Flynn and N. White (Pokwani), E. A. Pietersen, H. Abrahamson, and P. Weyer (Somerset East), L. Moffat and W. C. Frost (Tarka), R. F. Hurndall, M.L.C., and G. L. van Niekerk (Uitenhage), C. H. Currie and C. Gardner (Upper Albany), H. Collins, M.L.A., and J. J. Odendaal (Victoria East), A. C. Maclachlan (Vryburg), E. W. McDonald (Whittlesea), F. W. Baker and J. J. Loock (Willowmore), H. T. Sills (Wodehouse), J. C. Laing (Xalanga), C. G. Lee and H. A. Murray (Zwart Ruggens).

O.R.C. FARMERS' CONGRESS DELEGATE.

The President introduced Mr. A. C. Stuart, representing the O.R.C. Farmers' Congress (Central Farmers' Union), and extended a hearty welcome to him. The President also introduced Colonel Robinson (commanding Cape Police), and Messrs. A. Davidson (Chief Inspector of Sheep), Dewar (Eastern Province Entomologist), and Elley (Veterinary Surgeon).

Mr. Stuart responded to the welcome, and conveyed cordial greetings from the O.R.C. Central Farmers' Union.

Colonel Robinson and Messrs. Davison and Dewar also responded.

PRESIDENT'S ADDRESS.

The President (Mr. W. H. Hockly) then read the following address:—

Gentlemen,—I have very much pleasure in welcoming you here to-day. In deciding, at the meeting held in February last, to meet at Oudtshoorn, we departed from our usual practice of meeting at centres convenient to the largest number of delegates. This decision was come to by a unanimous vote. It would, of course, have been quite impracticable had there not been railway communication, the absence of which has, no doubt, prevented the extension of the Central Farmers' Association in the formation of branches in this direction. Then the different conditions of farming have also had some influence. I trust that our present meeting will shew that there are many questions in which our interests are identical, and that it ought to be to our mutual interest to meet together.

At our last meeting the hope was expressed that the good season we then had was the forerunner of many more, and so far this has been realised. We have had general rains throughout the Colony, and enough to give abundance of pasture, and in many cases restoring the springs which had ceased to flow. Stock has had abundance of food and are in good condition, and a very good increase has been the result.

Our contention that the stock of the country has sufficiently increased to justify the imposition of the meat duty has been quite borne out by results. That, together with good demand for wool, mohair, and feathers, I think justifies us in thinking that we have at last turned the corner. You will have the Hon. Mr. Hurndall's report of work done by the Parliamentary Committee; it shews that both the Government and the Parliament are giving the subjects submitted by Congress a very fair and favourable consideration.

You deputed Mr. J. Arnold and myself to wait upon the Government during the session, to impress upon them the desirability of amending the Jackal Proof Fencing Act, and defining clearly what constituted "beneficial use," and also to grant facilities to farmers anxious to fence their farms.

We had, together with Mr. Hurndall and Mr. Hall, who was in Cape Town at that time, a very satisfactory interview with the Premier and Secretary for Agriculture. They thoroughly sympathised with us, and promised to do all in their power, as opportunity offered, to bring in an amending Bill. In the meantime they hoped to get the most liberal interpretation upon that clause.

Second, *re* loans for fencing, we made it clear that we were not asking for any free grants, but only loans upon perfectly safe security, the interest to be about 4 per cent., with the addition of an amount as sinking fund, and to be redeemed, say, in ten years, in no case to exceed fifteen years. Another concession made is that if five farms combine, a loan can be obtained, the lands not necessarily joining each other. We would like this extended to a single farm, where the security is quite satisfactory. Then on railway lines where the owner wishes to put up netting, Government will pay one-half the cost of such fencing.

You further appointed your Secretary, Mr. Hall, and myself to attend the O.R.C. Farmers' Union as delegates. We were accorded a very hearty welcome, and attended all the meetings. I believe one result of our meeting is that it has brought about a very good feeling between that Association and our own, and will eventually lead to a closer union between these two organisations.

The proposal to be represented at this Congress was heartily supported, and two gentlemen were elected as delegates to this meeting.

Gentlemen, as usual, we have a long agenda paper, and your time will be fully occupied. I trust that our meeting will be a most profitable one, and that one of the results will be that the Eastern and Western Districts will be drawn closer together, and that in time branches will be established in all parts of the Colony.

Mr. Francis (Molteno) moved "That the address be adopted."

Seconded by Mr. Joubert (Lady Grey), and agreed to

SECRETARY'S REPORT

The Secretary's report was taken as read, as follows:

Bedford, March, 1907.

MR. PRESIDENT AND GENTLEMEN.

I have the honour to submit the following report:—

A copy of the minutes of the last annual meeting was sent to each member of Parliament, and letters dealing with each resolution were addressed to the members of the Ministry to whose department these belonged respectively. As these matters are dealt with in the Parliamentary Executive Committee's report, I propose only referring to the replies on certain questions as indicating the views of the Government, and thus curtail my report to within reasonable limits.

Jackal Fencing.—Messrs. Hockly and Arnold, who were accompanied by Mr. Hurndall, M.L.A., and myself, interviewed the Premier and Minister for Agriculture on this subject, and fully explained the views held by Congress. Since the session of Parliament closed, I have been assured "that the matter will be further considered during the recess." If the object be attained, an adjacent owner would have to contribute half the cost of such fencing already erected at the time his liability commenced (that is, when half the length of his boundaries was enclosed), or which might be erected hereafter."

Barbed Wire Fences.—"This matter is receiving attention in connection with a Fencing Bill, which it is proposed to introduce into Parliament. I may point out that under Section 2 of Act 42 of 1905, no owner or lessee, upon whose land a vermin proof fence may be erected under that Act, is liable for any damage occasioned by any person or to the property of any person by coming into contact with such fence."

Noxious Weeds on Crown Lands.—To summarise—"Crown Lands are equally liable (with other properties) to the law compelling the destruction of weeds, which may be proclaimed 'noxious.' Whenever such weeds are reported, steps are immediately taken for their eradication. It is possible such weeds may flourish on Crown Lands, but the Secretary for Agriculture points out that in such cases this must be due in a large measure to the supine attitude of the local authority, for if the provisions of the Act were enforced, Crown Lands could not escape notice, and steps would be immediately taken to remedy the complaint."

Jointed Cactus.—"The report of the Select Committee is receiving the attention of Government with a view to ascertaining the best mode in which the destruction of these weeds may be effected. As a preliminary step, experiments will be conducted to determine the most effective and economical medium of destruction. Once that is settled, consideration will be devoted to devising a comprehensive scheme. In framing legislation, the restriction of importation of Cacti will receive consideration.

General Dog Tax.—"While Government is not prepared to introduce special legislation to secure the end contemplated by the Association, the question raised will be carefully considered in the event of any amendment of the Divisional Councils Act."

Free Railway Passes.—The General Manager regrets inability to give favourable consideration. If free railway passes are granted to delegates of the Central Association, delegates of other Congresses would also make a similar request on the ground that they attended in the interests of the country generally. If granted to one body, it could not be withheld from others.

Railway Tariff on Colonial Produce.—Under consideration as the outcome of the Customs and Railway Conference at Pietermaritzburg.

Railway Facilities for Griqualand West.—Railway from Belmont to Douglas was included in the Railway Bill.

Farm Labourers.—The Department cannot see its way to extend the 5s. rate applying from stations on the Eastern system, to stations on the other systems.

Tariff on Rhodesian Railway.—This is fixed by the Company, and does not come under the jurisdiction of the Cape's administration.

Bechuanaland Natives.—"The difference in the law applying to natives in the Colony proper and natives in Bechuanaland, *viz.*: (a) Prohibition of liquor; (b) the Glen Grey Act; (c) the power of chiefs to try cases between their own people. In respect of each of these heads, the Colonial Government definitely committed itself in the negotiations leading up to the annexation of the country. The Prime Minister does not consider there are any evils from these causes sufficiently serious to justify rescinding legislation which would be regarded by the natives as an open breach of faith."

Labour Bureau.—"Past experience in Native Labour Bureaus has not been a success, and shews that the main difficulty lies in inducing natives to enrol themselves. They entertain strong objections to being entered on a list to which they attach a mistaken significance, and prefer to go to a much greater trouble in order to make their own arrangements."

Irrigation, Floodwaters, etc.—The Executive had an interview with the Commissioner on these matters, and fully explained the resolutions and wishes of Congress; and Dr. Smartt was sympathetic, and promised careful consideration. The Irrigation Act passed last session, if not entirely satisfactory, meets the views of Congress in many respects.

Slaughter of Lungsick Cattle.—It is interesting to note that after sixteen years' persistent agitation, the views of Congress have at last been recognised by the Legislature. In 1895, a Bill passed the House of Assembly, but was rejected by the Legislative Council. The Act passed last session legalises the slaughter of diseased cattle, and provides for compensation; so that we may hope that lungsickness will gradually disappear from the country.

Ostrich Feather Thefts.—This matter has received the attention of the Attorney-General, who purposes bringing in a Bill next session of Parliament. I have invited Mr. Sampson to attend Congress to hear the discussion on the subject.

It may be stated, in conclusion, that the replies to correspondence indicate that Government is sympathetic in its attitude to Congress.

Agricultural Union.—In accordance with instructions issued at last Congress, the Vigilance Committee met the Executive of the Agricultural Union for the purpose of defining spheres of labour. Minutes of the meetings held at Port Elizabeth and Cape Town respectively are on the table, and delegates will note that representatives of the Fruit Growers' Congress took part in the last meeting.

O.R.C. Farmers' Congress.—The President and myself attended the Congress held at Bloemfontein, and were accorded a most hearty reception. The presence of representatives from our organisation was welcomed as a practical sign of sympathy between two kindred organisations, and will, I believe, be productive eventually of a closer union between the two bodies. One outcome was that two O.R.C. representatives were elected to attend this Congress; and though I regret to learn that only one will be in attendance, yet that one, in the person of Mr. A. G. Stuart, will, I am confident, receive a most cordial welcome from you, and feel that the bond of sympathy between brother farmers is not limited by the arbitrary boundary line dividing the two Colonies.

Parliamentary Committee's Report.—Copies of this report were transmitted to each branch early in January, and if I may be allowed to do so, I would suggest that a special vote of thanks be accorded the Parliamentary Committee, to be submitted through their President (Mr. Hurndall, M.L.C.) for their excellent work during the last session.

Government Experts.—The usual steps were taken to secure the services of Government experts; and I have pleasure in stating that Colonel Robinson, commanding the Cape Police, will be with us, as well as the Chief Inspector of Sheep (Mr. A. Davison), and Mr. Elley, Veterinary Surgeon, but at date of writing I have not heard from Dr. Nobbs. Mr. Lounsbury was unable to attend as he is leaving for a six months' trip to America; and the Chief Veterinary Surgeon (Mr. Borthwick) is too busy with arrangements in connection with the Amended Animals' Diseases Act. I specially invited Dr. Hutcheon, Director of Agriculture, but do not know if he can be present.

The Commissioner (Dr. Smartt), in reply to an invitation, regretted pressure of engagements prevented acceptance, but, possibly, the Director of Irrigation will attend.

The Attorney-General sent me the following telegram on the 4th March:—"Kindly let the Central Association know on the 12th March that I shall be in the Midlands about the end of the month for a couple of weeks to prepare a Bill dealing with Ostrich Feather Thefts. I propose holding meetings of farmers at Grahamstown, Graaff-Reinet and Oudtshoorn. Information as to exact dates will be given by Magistrates later."

To this I replied:—"Congress will fully discuss matter, there being twelve notices of motion on the subject. Could you not attend, and thus obtain views of practically the whole country on the matter, instead of those of two or three centres only."

On the 7th, the Attorney-General wired:—"Sorry, can't possibly attend Congress, but Congress might appoint deputation for interview somewhere on my tour; my proposal may drastically affect buyers, and they must be consulted, as well as farmers.

Branches.—It is my pleasing duty to report that the Central Association is growing steadily, there being now forty-nine branches, an increase of six since last year, *viz.*:—Bontebok Flats, George, Oudtshoorn, Steynsburg, Steytlerville, and Uitenhage. I have not heard from Ventersiad, Tylden, or Bathurst, while the Stockenstrom and Queenstown branches have been unable to hold meetings during the past few months, but I hope will soon resume working. Naauwpoort have not formally applied yet, but have sent a resolution for discussion. I am hoping that some of the Border Associations which withdrew last year will again become branches of the Central.

Congress.—As indicating the interest taken in the annual meeting of the Farmers' Parliament, if I may so call it, it is gratifying to state that forty-three branches will be represented by seventy-six delegates. This Congress, both in number of delegates, as well as branches represented, is the best on record.

I have to acknowledge the courtesy of the Oudtshoorn Town Council in granting the Town Hall free of charge for our meetings; and also the welcome aid rendered by the Oudtshoorn Branch in providing tables, chairs and lamps. I also express my gratitude to the President (Mr. Edmeades) and Secretary (Mr. Allan) for the ready assistance they have rendered me.

Through the courtesy of the Commissioner and General Manager of Railways, through saloons were attached to trains at convenient points, thus obviating the inconvenience of numerous changes. This necessitated a considerable number of letters and wires. I hope the arrangements meet with the approval of the delegates.

Congress will probably be invited to visit the celebrated Cango Caves, and in reply to a telegram on the matter, I suggested Thursday or Friday as a suitable time.

I place on the table the financial statement for 1906, a list of branches at date, copies of this report, and minutes of meetings between the Agricultural Union Executive and our Executive.

As instructed, I requested the Treasurer of the Hillier Fund to hand the amount to Miss Hillier, and Mrs. Goulden sent me her receipt for £113 13s. 2d.

In accordance with instructions given at last Congress, our constitution and rules were printed in Dutch, and copies sent to each branch.

Any branch requiring copies of either English or Dutch rules can obtain them on application to me.

I would gratefully acknowledge my indebtedness to the Editor of the *Agricultural Journal* for publishing the minutes of last Congress in English and Dutch.

In conclusion, I trust the present Congress will be characterised with the same spirit of earnestness and single hearted desire to advance the great industry on which the prosperity of our country must almost entirely depend, and that the spirit of enterprise which has marked that industry during recent years will have its reward by making the Cape Colony one of the greatest producing countries in the world.

THOS. C. HALL, Secretary.

The following is the report (referred to in the Secretary's report) of action taken in connection with defining spheres of labour:—

Minutes of meeting of Executives of the Central Association and Agricultural Union, at Port Elizabeth, on the 5th April, 1906.

Present:—*Central Association*—Messrs. Hockly, Jno. Arnold, Hurndall, M.L.A., Thomas, M.L.A., Baker and Hall.

Agricultural Union Executive—Messrs. F. C. Baily, Rawbone, D. M. Brown, McDermott, Evans, Dr. Nobbs, and Malleson.

Mr. Hockly was voted to the chair, and sketched the origin of the meeting.

After discussion, Mr. Lee (President, Union) moved "that it be a recommendation that the Union appoint its Executive, and the Central its Executive, to meet annually for the purpose of co-operating in securing the aims of each body." Seconded by Mr. Baker.

Mr. Hall moved, as an amendment, "that in the opinion of this meeting, representing the Agricultural Union and the Central Association, it is desirable to define spheres of labour as far as practicable, and this be a recommendation to the respective organisations." Seconded by Mr. Arnold.

Mr. Evans moved, as a further amendment, "That this meeting of delegates, representing the Agricultural Union and Central Association, desire to affirm the principle of the necessity of unity of action between these two bodies, and would recommend that the Executives of both bodies be entrusted with the drafting of a scheme by which this end could be attained."

After discussion, the original motion was withdrawn, Mr. Hall reluctantly withdrew his amendment, and Mr. Evans's amendment was agreed to unanimously, having been seconded by Mr. Arnold.

It was resolved that a further meeting of the Executives be held in Cape Town, and that the Presidents of the Central Association and the Agricultural Union be the joint conveners.

Minutes of meeting of the Executive of the Central Farmers' Association, Agricultural Union, and Horticultural Board, held at Cape Town in May, 1906.

For *Central Association*: Messrs. Hockly, J. Arnold, Hurndall, M.L.C., Thomas, M.L.A., Baker and Hall.

Agricultural Union: Messrs. Hutcheon, C. Lee, D. M. Brown, McDermott, Evans, Dr. Nobbs, Messrs. Ryan and Rawbone.

Horticultural Board: Messrs. Kohler, Hards and Malleson.

On the motion of Mr. Arnold, Dr. Hutcheon was voted to the chair.

Dr. Hutcheon, taking the chair, said that all present knew the object of the meeting.

Messrs. Hards, Kohler and the others stated the question had been before the Horticultural Congress, and wished to know if they would be allowed to take part in this meeting.

Mr. Hall then read the minutes of the meeting held in Port Elizabeth.

Mr. Hards moved: "That the Agricultural Union take into consideration the advisability of dividing their work into three sections, *viz.*, Agricultural Section, dealing with Agricultural Shows, Farmers' Associations, Fruit Growers' Associations, each to meet at the same time and place, but each section to discuss, separately, the business connected with their section."

Mr. Hockly moved, as an amendment, "that in the opinion of this meeting, the time has arrived when the spheres of labour should be defined for the several organisations, *viz.*, the Agricultural Union, the Horticultural Board, and the Central Association." Seconded by Mr. Arnold.

Mr. Hards withdrew his motion, and Mr. Hockly's amendment was agreed to.

Mr. Arnold proposed, and it was agreed to, "that three members of each body be elected to form a committee to define spheres of labour—Central Association, Messrs. Hockly, Hall and Arnold; Agricultural Union, Messrs. Rawbone, Michau and Lee; and Horticultural Congress, Messrs. Hards, Kohler and Malleson."

Meeting to-morrow afternoon, at 5 o'clock.

Mr. Arnold moved, "That the Congress of each organisation nominate six delegates, who shall form an Agricultural Council, such Council to meet after the Congress to present the combined reports to Government, and, if any matters, common to all, arise, the same to be considered and decided upon." Seconded by Mr. Hards, and agreed to.

On reassembling of the Committee, after discussion, the following spheres of labour were agreed to:—

That the Fruit Growers' Congress deal with matter appertaining to horticulture and viticulture.

That the Agricultural Union deal with Agricultural Shows and all matters appertaining to shows.

That the Central Association deal with all matters relating to farming industries, except such spheres of labour as are allotted to the other Congresses.

The report of the Committee, as above, was ordered to be brought before the meeting of the several Executives the next evening.

The Executive reassembled at 8 o'clock p.m.

Mr. Kohler appealed that he might be allowed equal voting with the others.

After discussion, it was resolved that each organisation be allowed one vote.

Minutes read and confirmed.

The report of the Committee was read, when Mr. Lee stated that the Union delegates objected to it.

After lengthy discussion, Mr. Kohler moved the adoption of the report.

Mr. Hall moved to take clauses seriatim.

Neither was seconded, and further discussion took place.

Mr. Lee moved that the matter remain in abeyance for six months. Mr. Ryan seconded.

Mr. Hockly moved that the clauses be taken seriatim. Seconded by Mr. Arnold.

Mr. Cumming moved, an as amendment, "That this meeting is in favour of a Council, and that all references to spheres of labour be omitted." Amendment negatived.

Resolved that the Committee's report be adopted.

The following letter was received from the Agricultural Union:—

Sir,—With reference to the meeting held recently in Cape Town between the Executive of the Central Farmers' Association, representatives of the Vine and Fruit Growers' Congress, and the Executive of the Agricultural Union of Cape Colony, on the suggestion for a scheme for the closer working of these bodies, I am instructed to make clear the attitude of the Union before any further action may be decided upon.

First.—The Agricultural Union regrets that it cannot accept the part assigned to it in the proposed "Spheres of Labour," namely, to deal only with matters appertaining to Agricultural Shows, as to do so would mean abandoning much useful work done in the past, and possibly prevent its policy being carried out in the future.

Second.—The Union is fully prepared to accept the principle propounded at those meetings of an Agricultural Council representative of all three bodies, and is willing to move in that direction, in conjunction with the other bodies, whenever it may be considered advisable.

I am further instructed to point out that one of the main reasons which actuated this Union in moving in the direction of unification was the desire that every section of the agricultural interest of this Colony should be fully represented at the Conference of the Inter-Colonial Union of South Africa. My Executive would, therefore, be pleased if your Executive would consider this aspect of the question and offer suggestions, as the Union is quite prepared to make room for delegates from the Farmers' and Fruit Growers' Congresses, or the Horticultural Boards, should they be chosen to represent the latter industry. Under the rules, the Cape nominates ten "Voting Delegates" to the Inter-Colonial Congress, with the right to send as many others with the right to speak, but without votes, as may care to attend. Other Colonies are equally represented.

Objects of the Union.

In reply to statements which have been made from time to time as to the scope and objects of the Agricultural Union in the past, I am instructed to call your attention to the fact that this body has been in existence for upwards of thirteen years, and that the foundation rules contained the following:—"The chief object of this Union shall be to establish co-operation between the various Agricultural Societies of South Africa with a view to promoting the welfare of the various agricultural and pastoral pursuits of South Africa." The latest amended rules read:—"That the objects of this Union be, in conjunction with similar organisations: (a) The encouragement of mutual and concerted action on all subjects affecting agriculture in its various branches in the Cape Colony; (b) to promote and secure, as far as possible, unity of action in all agricultural developments in the various Colonies and States of South Africa."

Working along these lines the Agricultural Union has, in addition to other functions, succeeded, with the hearty co-operation of the other Colonies, in establishing the South African Stud Book, with all its subsidiary organisations, and the Inter-Colonial Agricultural Union. Neither of these could have been accomplished had its energies been restricted solely to the working of Agricultural Shows. And as there is still room for much useful work of this description in South Africa, the Union feels that it would be against the interests of the whole country were it to accept any restrictions upon its liberty of action at this particular juncture.

Another phase of the question I have been instructed to present for the consideration of your Association is that of the large body of agriculturists who look to the Union to help them to safeguard their interest. In many parts of this Colony the only agricultural organisations are the Agricultural Societies, which not only conduct the local Agricultural Shows, but perforce voice the views of the districts on all agricultural questions. Were the Union to accept the position suggested, and confine its energies entirely to show matters, these people would feel themselves abandoned by a body they have hitherto fully trusted. Will you please submit this letter to your Executive at the earliest opportunity, and advise me of the results of their deliberations at your convenience. Copies are being forwarded to the Western and Eastern Horticultural Boards for consideration of the suggestions contained therein.

A copy of the foregoing was submitted to each member of the Executive.

Their replies indicated that a further meeting to consider Mr. MacDermott's letter was not desired, and that the matter be placed before Congress.

THOS. C. HALL, Secretary.

Mr. Francis (Molteno) moved "That the consideration of the report stand over until to-morrow (Wednesday) morning with precedence. Seconded by Mr. Rehbok, and agreed to.

THE ATTORNEY-GENERAL ON OSTRICH THEFTS.

The Secretary referred to certain telegrams from Mr. Sampson *re* proposed Ostrich Feathers Thefts Bill, and the meetings he will hold at certain centres; and he also read a letter from the Attorney-General (addressed to Mr. Hurndall, M.L.C.), on the matter.

Mr. Hall (Bedford) moved "That the matter be considered this afternoon, with precedence." Seconded by Mr. Weyer, and agreed to.

PARLIAMENTARY COMMITTEE'S REPORT.

The Secretary read the Parliamentary Committee's report as follows:—

I have the honour to report as follows, *re* the motions carried at the meeting held at Queenstown on the 19th February, 1906, and the action taken by your Parliamentary Committee.

Trespass.—This matter was dealt with by a Select Committee which resulted in a stringent Act being passed, which will, no doubt, be of great benefit to the farming community; a clause was also inserted making game running in enclosed land the property of the owner.

Location Act.—This matter was dealt with by a Select Committee, and recommendations made.

Sale of Lease of Land by Natives.—Referred to Select Committee.

Dr. Hutcheon's Writings in Book Form.—All the Doctor's works are being revised by himself and, when completed, will be published.

Compulsory Slaughter of Lung Sick Animals.—Act passed legalising this.

Uniform Regulations for Diseases of Stock.—This must be dealt with by Inter-Colonial Agricultural Union.

Increase Veterinary Staff.—Colonial finances will not admit at present.

Bars in Ostrich Feathers.—Government have authorised Professor Duerdon, of Grahamstown, to investigate.

Ostrich Flies.—Government unable to deal with at present.

Bechuanaland Natives.—Not necessary to approach Imperial Government.

Native Labour Bureau.—Act passed dealing with this.

Meat Trust Monopoly.—Bill introduced, but thrown out in Council.

Meat Duty.—Given effect to in Customs Convention.

Irrigation Act.—Passed.

Codlin Moth.—Government are dealing with this, and are endeavouring to propagate natural enemies.

Facilities for Purchase of Dynamite.—Restrictions have been lessened.

Expenses for Escorting Prisoners.—The Colonial Secretary has promised to look into this matter.

Paraffin for Irrigation Purposes.—Being sympathetically considered.

Fencing Laws.—A Loan Bill was introduced, but, unfortunately, the Committee stage was not reached when Parliament was prorogued.

Barbed Wire Manufactures.—A matter for Chambers of Commerce.

Colonial Products and Manufactures.—Customs Convention deals with this.

Scab Act Enforced in Bechuanaland.—Complied with.

Colonial Produce for Government Institutions.—This is being carried out as far as possible.

Free Railway Passes.—Government do not feel justified in carrying this into effect at present owing to falling revenue.

Natives with Liquor in Prohibited Areas.—This should have been dealt with in new Liquor Bill, but this Bill stands over for next session.

Compulsory Dipping for Ticks.—The Government are of opinion that the time is not quite ripe for this.

Licensed Feather Premises.—The Attorney-General has promised to introduce a Bill next session.

Analysis of Soils.—This is being attended to.

Destruction of Locusts.—Government are obtaining all information possible with the object of legislation.

Noxious Weeds.—This is entirely in the hands of Divisional Councils.

Jointed Cactus.—Handed over to Select Committee on Prickly Pears.

Artificial Manures.—The Government had a Bill drafted in connection with this matter.

Experimental Station in Eastern Province.—A motion was carried in the Upper House to this effect, and Dr. Nobbs authorised to report.

Arsenite of Soda.—Referred to Select Committee on Prickly Pears.

Railway Rates for Farm Labourers.—Government promised to deal with this.

Mal de Gomma.—Government dealing with this.

It will be seen that nearly all the subjects passed at our last meeting have had some attention, and I have no doubt a deal of legislation will result from our deliberations.

The most important subject, I think, is the Trespass Act, which, from what I can gather, has given universal satisfaction. The only complaint is that it does not protect unenclosed properties. This was not overlooked; in fact, a lot of time and thought was given, but we ultimately decided that it could not be, as the measure would have been too stringent and would have endangered the Bill becoming Law.

I have the honour to be, Gentlemen.

Your Faithful Servant,

R. F. HURNDALL.

Chairman Parliamentary Committee,
Uitenhage, 5th December, 1906.

Mr. Adams (Kimberley) moved "That a vote of thanks be accorded the Parliamentary Committee for the action taken by them last Session."

Seconded by Mr. Evans (Bedford), and agreed to.

Mr. Edmonds (Komgha) moved "That the report be adopted." Seconded by Mr. Maclachlan (Vryburg), and agreed to.

HOURS OF SITTING.

Mr. Hall (Bedford) moved "That the hours for sitting be from 9 a.m. to 12.45 p.m., and from 2.15 p.m. to 6 p.m., and from 8 p.m. Seconded by Mr. Roberts, and agreed to.

INVITATION.

Mr. Edmeades, on behalf of the local Farmers' Association and the people of the district, invited Congress to visit the Cango Caves on Friday.

Mr. Hall (Bedford) moved "That the invitation be accepted, with thanks, for Friday." Seconded by Mr. Francis (Molteno), and agreed to.

AUDIT COMMITTEE.

The President called for nominations for the Audit Committee.

The following delegates were nominated: Messrs. Baker, Collins, M.L.A., Roberts, and H. A. Murray.

On a vote being taken, Messrs. Baker and Murray were elected.

WELCOME.

Mr. C. M. Lind (Mayor), accompanied by members of the Town Council, and Town Clerk, was in attendance, and gave Congress a very cordial welcome to Oudtshoorn.

Mr. J. Matare (Chairman of the Chamber of Commerce) was also in attendance, and extended a welcome to Congress on behalf of the commercial community.

The President warmly acknowledged the welcomes on behalf of Congress.

REVISING COMMITTEE.

Mr. Roberts (Fort Beaufort) moved "That the Revising Committee consist of one delegate from each branch represented at Congress." Seconded by Mr. Hall (Bedford).

Mr. G. L. van Niekerk (Uitenhage) moved, as an amendment, "That the Committee consist of five members."

Mr. Joubert (Lady Grey) moved "That three be appointed."

On a vote being taken, Mr. Roberts's motion was agreed to.

ABSENT MEMBERS.

The Secretary read a telegram from Messrs. J. Arnold, Stephen and Friend, stating they were detained at Rosmead, having missed the connection; and also from Mr. Carlisle (Hay) that he is unable to attend, but wishing Congress a successful session.

Congress adjourned at 11.30 to enable the Revising Committee to do their work.

(*To be Continued.*)

A CASE OF TRAUMATIC PNEUMONIA.

By J. Spreull, M.R.C.V.S., Government Veterinary Surgeon.

An interesting case of this disease came under my notice in Grahamstown in January, 1906. The animal, a milch cow, owned privately, had the symptoms of a mild pneumonia, which I localised by auscultation of the chest as affecting the lower portion of the left lung. After a few days of febrifuge treatment, the cow seemed to be getting better, when suddenly she developed redwater symptoms, and died. On postmortem examination, in addition to the typical lesions of redwater, I found lodged in the left lung, and surrounded by a hepatized and semi-gangrenous area, a strong hard piece of bone, four inches long, and wedge-shaped, one end being sharpened to a very fine point. Opposite this spot on the costal pleura, I found some extravasated blood, and externally there was a very small wound, already almost healed, at a point in the skin which in the living animal would be covered by the point of the elbow, and had, therefore, easily escaped our notice during the clinical examinations. The native herd, a Kafir, who bore a bad character, had quarrelled with the owner just prior to the cow being first noticed ill, and as he was at once discharged, it is very probable that the "boy" took this way of getting even with his master. As this native herded for other cattle owners on the commonage, where there are many herd boys, there was obviously very little chance of bringing the guilt home to the culprit.

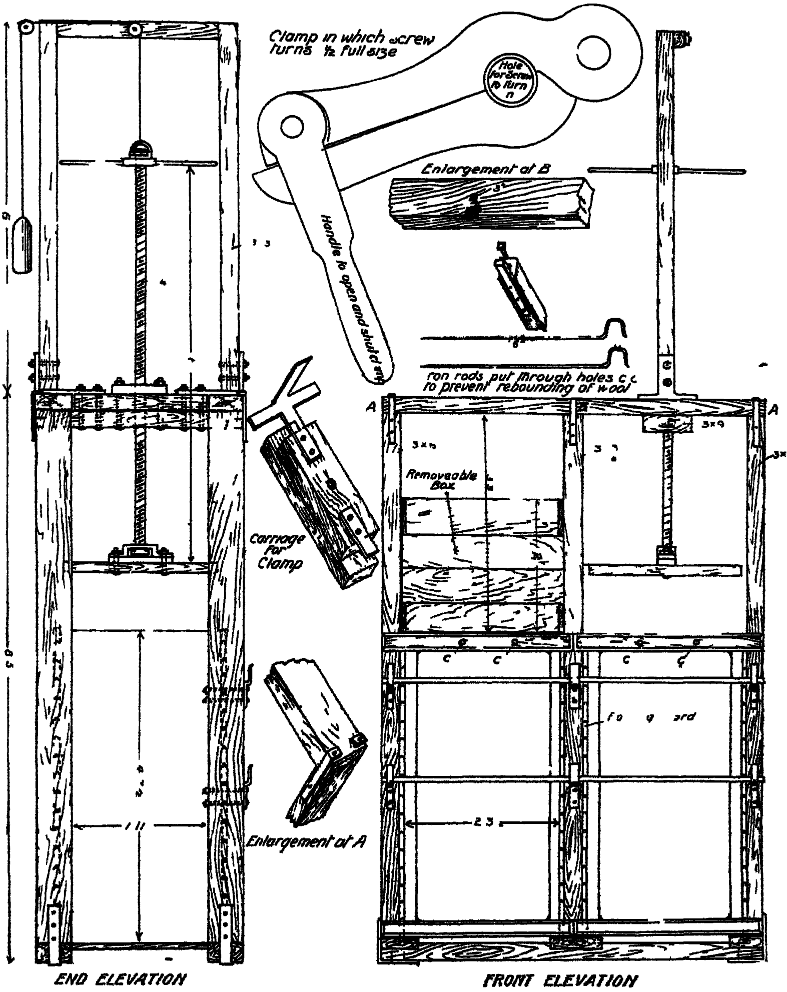
The piece of bone I judged to be, from its thickness, part of the outer aspect of an ox's tibia. It had evidently been trimmed very carefully with a knife or piece of glass, and was so smooth that it could easily have been driven into the chest at an intercostal space by a sharp blow from a hammer, stone, or even the palm of the hand. From the position in which I found it, it almost looked as if it had been intended to pierce the heart, and so produce instant death. Apart from the motive of revenge, the South African native will occasionally commit such deeds in order to secure a feast of beef for himself and friends, for there is little chance of his vicious act being detected where, as so often happens, the diagnosis as to the cause of death is left to himself, the owner, a townsman, being either all unsuspecting or too ignorant of stock diseases to consider it worth his while being present at the opening of the carcase. As we all know, no carcase, unless it is absolutely putrid, and no matter from what disease death has ensued, is in the native's eye unfit for his own household consumption.

FARMERS' WOOL PRESSES.

Mr. J. M. Orpen writes from Barkly East:—The movement for the improvement of the get-up and packing of wool initiated by Wool Growers' Associations stimulated farmers last year to obtain wool presses to obviate the prohibited trampling of wool in wool packs by men's feet. My neighbours, Messrs. C. and I. Sephton, of Glengyle and Balloch, invented and put up one for themselves in time for shearing, and it answered well, and kept up with twenty shearers during the shearing of several thousand sheep. I think it very ingenious, simple and quite a new invention, and have, therefore, obtained from them permission to send you the enclosed drawing and specification of the press. (Published herewith.)

I saw lately an Australian press at work during shearing at the farm of Mr. T. T. Hoole, Atherstone, near Grahamstown. It cost £17 10s. in Australia. It worked very satisfactorily. I have also seen in the Australian *Pastoralists' Review* illustrated advertisements of several different presses, some of them patented and well recommended. The wool pack used with all these Australian presses appears to be some eight or ten inches shorter than that used in this Colony. Progressive farmers must look somewhat to the guidance of the Agricultural Department with regard both to the presses they must adopt and the sorts of wool packs they must use in future, and the whole matter is a pressing one for those farmers who wish, as the Associations do, to adapt their methods to the requirements of wool buyers in Europe. They must have their presses ready next shearing season if possible, and they must get such presses as are most economical, both with regard to construction and use if the mass of the sheep farmers are to be induced to follow their example soon. It is for this reason that I write to you and send you the plan and description of Mr. Sephton's press. I think it will be found in both construction and speed and cheapness of work the cheapest which has been as yet invented. Be that as it may, I should like to see the inventive genius brought to bear in the matter as soon as possible, and publications in the *Agricultural Journal* would promote this.

Mr. Sephton's press, which I saw worked, was intended for *three* ordinary wool pressing cases in one frame, all pressed by *one* screw fixed into a board fitting loosely into the pressing cases, but their wood fell short at the time. They say that one screw could quite easily be used to press wool in five or six such pressing cases all in a row in one frame. This makes for economy and speed, and the getting classified wool quickly into bales and out of the way, instead of being heaped up awaiting its turn to be pressed The screw as Messrs Sephton first put it up, was slung to a pulley running on a bar hung up over the pressing cases It was slipped backwards and forwards by means of this pulley and bar from over one pressing case to over another at a mere touch of the hand The screw was also thrown out of the grip of the split nut or "clamp" which held it (a very ingenious contrivance) at a mere touch, and then either fell to the level of the wool to be pressed or was raised from the pressed wool to


Clamp in which screw turns ½ full size
Hole for Screw to turn in
Handle to open and shut clamp
Enlargement at B
Iron rods put through holes c c to prevent rebounding of wool
A
A
3×9
3×6
Removeable Box
Carriage for Clamp
Enlargement at A
c
c
c
c
2 3
END ELEVATION
FRONT ELEVATION

Farmers' Wool Presses

its highest position at a mere touch. They have since added to the height of the frame work, and I suppose the iron bar is now kept in position in this frame or a wooden bar substituted overhead. I think that with this screw a farmer with 5,000 or 6,000 sheep to shear should have five pressing cases in a row, but could *manage* with only two, as the Messrs. Sephton did.

In the Australian wool presses two pressing cases equal in height stand alongside each other. When both are filled with fleeces the one is hoisted, and either turned upside down on top of the other, or shifted without overturning on top of the other, and the contents of the two are pressed into one. In Mr. Sephton's press there is a shallow, light, topless and bottomless box, which is shifted by hand very easily from the top of one pressing case to the top of another. When this is in position, wool is filled into the pressing case, and this box, and pressed down by screwing, which goes quickly. When the wool is pressed down far enough, a touch to the handle of the screw raises it a little above the wool, which then rises a little by its elasticity. Then the clamp is opened at a touch, and the screw raised at a touch, and the pressing case and box are filled up again, and their contents pressed down together into the case, which then is full enough. You will see that the whole iron work of Mr. Sephton's press cost him £10 15s. It would probably come to much less if there was a demand, and the work could thus be done wholesale. His wood work cost him £3 10s., and the putting together was done by himself. A main requirement is the strengthening of the frame work with iron, as shewn in Mr. Sephton's drawing, to bear the strain of the pressing.

SPECIFICATION BY MR. SEPHTON.

The outer frame work is constructed with beams 6-inch by 3-inch. The centre uprights are made of quarterings 3-inch by 3-inch, so as to enable the carriage to pass from one box to the other. The accompanying sketch shews two boxes; but the single screw can be used for three or more boxes.

By standing on a 2-ft. 6-inch platform, the fleeces can be packed in the bales without actually getting into them. The bale is packed to the top, and the pressure then applied. When the screw has been screwed to its full extent, it is given a few turns backward, when the clamp is opened and the screw drawn up. The removable box is then adjusted and packed to the top with fleeces.

After screwing to the bottom of top box, iron rods are put across, just under press board, and the screw is again drawn up. The bale can then be sewn up and the carriage be pushed to the other box. Bales thus pressed average from 400 to 410 lbs. The screw and clamps were made by Mackintosh and Innes, of East London, for £9 15s. The timber for the two boxes was obtained for £3 10s., in East London, and the remainder of the iron work for about £1.

E. P. HORTICULTURAL BOARD.

QUARTERLY MEETING.

The official report of the quarterly meeting of the Eastern Province Horticultural Board, held at Cradock, in the Town Hall Buildings, on the 15th March, 1907.

Present:—Mr. Jas. Leighton (President) in the chair, and Messrs. John Landrey, jun. (Vice-President), H. H. Hards, D. van Heerden and the hon. secretary, W. B. R. Goulden. Districts represented: King William's Town, Cathcart, Grahamstown, Cradock, and East London.

The minutes of the previous meeting were read.

The Acting Mayor of Cradock (Dr. Dick) welcomed the Board on this, its first visit to Cradock, and said that though but little had as yet been done in the district in the way of fruit culture, still they had some very nice local gardens to show them. It was wonderful what had been done in a small way in the gardens in and around the town. Some time back he had had an opportunity of visiting California, and he had been much impressed by the manner in which a gigantic fruit industry had been built up in that country. The Board had a great future before it, in assisting in the development of the horticultural and fruit industries of the Eastern districts of the Colony.

The Chairman thanked Dr. Dick for his kind welcome.

Mr. Landrey took exception to the word "recently" being included in the remarks made by him at last meeting *re* codling moth at Queenstown, which should read "but had since been informed by Mr. Lounsbury that he had found none of it there."

The necessary correction having been made by the deletion of the word "recently," the minutes as read were confirmed.

The Chairman read a letter from the Cradock Farmers' and Fruit Growers' Association, expressing regret at not being present to welcome them, and wishing them a prosperous meeting. Resolved that the secretary acknowledge the letter.

SOUTH AFRICAN PRODUCTS EXHIBITION.

The secretary reported anent the lack of support from many producers who were in a position to exhibit. Many of those who had promised to send exhibits had not done so.

Mr. Hards moved: "That this Board regrets to learn that so little support has been given by producers in the Eastern Province to the most liberal terms offered by Government enabling them to exhibit at the South African Products Exhibition now being held in London and would urge all Associations to impress upon members the desirability of supporting any such measures in the future."

REVISION OF DRAFT RULES.

The Chairman ruled that as the rules now being drafted were to be placed before the Eastern Associations at Congress for confirmation, any rule might be dealt with at this meeting. The secretary then read the rules as far as drafted at previous meeting.

Mr. Hards proposed that Rule 8 be taken as read at East London meeting, viz., "That representatives on the Board be elected prior to Congress." The secretary seconded. Mr. Landrey objected.

The Chairman pointed out that Mr. Landrey had already been elected for the year 1907-08. He said the rules would anyway have to be finally dealt with at Congress.

It was put to the meeting and carried.

Rules 9 to 14 were then dealt with, and it was resolved that copies of the draft rules be printed and distributed amongst the Association by the end of the month.

CYANIDE DEPOT IN EAST LONDON.

The secretary said he understood Messrs. Hockly & Co. had bought a small supply of cyanide from the Agricultural Department, and he now saw that the Department had placed a supply with the Civil Commissioners. If this was so, then Messrs. Hockly would be placed at a disadvantage after having gone out of their way to oblige. At the same time he fully understood the Department were meeting them in the matter by bringing the price in East London down to that in Capetown, viz., 1s. per lb.

The opinion was generally expressed that if Messrs. Hockly had this amount on hand, fruit growers and others might relieve them of it and the Associations were asked to bear this in mind.

It was resolved that the secretary write the Department thanking them for placing the cyanide in East London.

EXPERIMENTAL FRUIT PLOTS.

The secretary read a letter from the Department in which it was stated that a refund of the expenditure incurred would shortly be made. Letter recorded.

The secretary stated that the necessary amendments to the draft agreement were now made and they were awaiting completion by the contracting parties. The agreement had been placed before the meetings of the East London Association in January and

February, and had been deferred till March 23, when he presumed they would be finally dealt with. The secretary drew attention to the several amendments made which he maintained were thoroughly in accord with the resolutions of the Board of December 5, 1905, at King Williamstown. Circulars showing the conditions on which the plots would be established were sent to every Association. The East London Association had the circular published and called for applications on April 24, 1906.

Mr. Landrey stated that the offer he had made to Government and suggested certain alterations to the draft agreement, and considered that the Horticultural Board and the Local Farmers' Association should have more power to inspect the plots, as he argued that the Board and the Association were more deeply interested in the success or failure of the experimental plots than the Government expert would be.

It was ruled, however, that the Board had not now the power to reconsider or alter the agreements.

Mr. Landrey statd that the offer he had made to Government some three years ago of an experimental plot, he had now withdrawn, as he understood the Government were too hard up to provide funds for the planting of the plot.

After discussion it was proposed by Mr. Hards, seconded by Mr. D. van Heerden, that the secretary write the owners of the plots asking them to complete the agreements without further delay.

The Board adjourned at 2 p.m. On resumption, the matter of

CODLING MOTH

was dealt with.

A letter was read from the Department of Agriculture indicating that the regulations for the prevention of the spread of the codling moth are being strictly enforced. That the Railway Department is repeating the instructions to stationmasters in this connection. That in respect to Aliwal North district now in quarantine, no amendment of the regulations now in force would be justifiable. That *re* Queenstown, although codling moth, according to the entomologist, has not been found there, it is not intended to exclude Queenstown from the protected area as if this were done, infected apples from the West would be sold in town and the pest more likely in that way to be spread to farms. Also to the effect that the municipalities in the larger centres are being requested to instruct market masters not to sell any pears, apples, or quinces from the infected areas.

It was resolved that the letter be recorded.

ENFORCEMENT OF NURSERIES INSPECTION ACT.

A letter *re* above matter was read, being in reply to the letter sent pointing out several instances in which the Act was infringed.

Mr. Lounsbury hopes members will report any further infringements, giving full particulars in each case. The letter, after dealing with the instances of infringements, goes on to say in effect that the new regulations just published will, it is anticipated, greatly assist plant examining officers in detecting restricted and prohibited plants when they come mingled with large numbers of admitted plants as in the case now complained of.

The secretary pointed out that it was the Nurseries Inspection Act that gave rise to the regulations under which certain areas were proclaimed infected with codling moth.

The letter was recorded.

FRUIT BOXES.

The secretary reported that as resolved at last meeting he had written Mr. F. Ginsberg, M.L.A., and Major-General Sir E. Y. Brabant, K.C.B., M.L.A., on the matter of the high duty on fruit boxes. They had replied saying they would do all they could in the matter.

Mr. Hards moved that the Government be urged to obtain the consent of the parties to the Customs Conference to withdraw the duty of 15 per cent. on fruit boxes.

The secretary exhibited a Colonial made fruit box, price 3d f.o.r., Salt River, the manufacturer being W. G. Scott, Ltd. This sample box was sent in response to an inquiry *re* fruit boxes through the Government Commercial Agent.

FRUIT TREE STOCKS AND NAMES.

A discussion took place on the Commission on the most suitable stocks for fruit trees, and the correct naming of fruit, and the opinion was generally expressed that this was a most important subject. The secretary moved, seconded by Mr. Hards, that this be one of the subjects for Congress. Carried.

PROPOSED BORDER FRUIT AND FLOWER SHOW.

A letter was read from the King William's Town Horticultural Society expressing the opinion that the project was not feasible and asking the Board for a contribution to the prize list.

The secretary stated that the Association had not as yet, with one exception, sent in any suggestions, and in most cases the matter was in the hands of the district representative.

On the motion of Mr. Hards, it was resolved that owing to existing circumstances the time had not yet arrived when such a show could be carried out satisfactorily.

The secretary was instructed to write. the King Horticultural Society, regretting that the Board could not see their way to contribute.

FUMIGATION FOR NURSERY STOCK.

The secretary read cuttings from American papers, shewing the trend of opinion of nurserymen in the States as regards fumigation of all nursery stock. The balance of opinion swayed toward spraying.

Mr. Hards gave his experience *re* fruit trees—his trees had all been fumigated on leaving the nurseryman, and were clean and healthy.

The secretary said he had brought the matter on simply for the sake of discussion, as it was sure to come prominently before them in the future.

The Chairman remarked that the fumigation needed carrying out most carefully, especially as regards soft wooded plants. The Board was not in a position to give a decided opinion on the merits of spraying as against fumigation. He had found fumigation to answer well in the case of fruit trees.

The secretary read a letter from the Secretary, Royal Horticultural Society, in which full particulars as regards affiliation of Societies with the R.H.S. was given, also asking that seeds, plants, and cuttings of indigenous plants might be sent, and expressing a desire to assist the Board in any way possible. The opinion was expressed in the letter that the fruits grown in Eastern Province would meet with a ready sale, and steady demand if received in commercial quantities, and of uniformly good quality. Small quantities raise the prices of relative cost to the producer disproportionately, and one inferior consignment will prejudice public opinion for a long period.

Mr. Hards proposed that the secretary write the Secretary for Agriculture asking whether he thought it advisable to consider the question of affiliation of the Eastern Province Horticultural Board with the Royal Horticultural Society, England. Seconded by Mr. Landrey and carried.

NEXT CONGRESS.

Mr. Landrey proposed, seconded by Mr. D. van Heerden, that the combined Congress be held in King William's Town on May 15, 1907, and that the secretary advise all Associations and the Western Province Horticultural Board. Carried.

Mr. Hards proposed that the Executive meet at as early a date as possible for the purposes of framing the agenda paper and other business in connection with Congress to be left in their hands.

Mr. Landrey asked if any reply had been received to the resolution he brought forward at last meeting. The secretary said no reply was yet to hand.

The secretary was instructed, on the motion of Mr. Landrey, to draw the attention of the Cathcart Farmers' and Fruit Growers' Association to the resolutions of the Board, and action taken *re* codling moth.

The accounts in connection with Oudtshoorn Congress, paid under protest, were discussed, and the secretary instructed to acknowledge the letter from the Department.

The secretary was instructed to write asking for a contribution to the expenses of Congress, similar to that of Oudtshoorn, and to ask the support of the Western Province Board.

Accounts were passed for payment, and a vote of thanks accorded the Cradock Town Council and the Press.

The meeting then terminated.

DEHORNING OF CALVES.

Correspondents frequently ask as to the de-horning of calves. The time best suited for de-horning calves, or rather, preventing the growth of the horn, is so soon as one can feel the budding horn forming. It is then a simple matter. The hair should be cut away from the young horns as closely as possible, and the part cleaned with a rag moistened with a solution of ammonia and water to remove the oily secretion and clean the skin. A stick of caustic potash should then be applied to the spot covering the bud or embryo horn, and rubbed in until the skin rises, care being taken that the whole surface of the bud is included in the application, but no more. Should any sore unfortunately follow, cleanse the part well and apply a mixture of sulphur and tar. The sticks of caustic potash must be preserved in a closely stoppered bottle, otherwise they will melt by absorption of moisture from the atmosphere.

WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION.

Record of Eggs laid from 18th June to 31st March, 1907.

Pen No.	Breed.	Pullet No.	1st to 31st March.		TOTAL PER PEN.	
			Eggs.	Points.	Eggs.	Points.
1	Buff Orpingtons ..	1*				
		2	4	8		
		3	10	15		
		4	12	24	376	719
2	Partridge Wyandottes	5				
		6	10	15		
		7	5	9		
		8	6	12	332	557
3	White Wyandottes ..	9	16	32		
		10	13	26		
		11	17	34		
		12	10	18	568	1089
4	White Leghorns ..	13				
		14	9	13		
		15				
		16	20	39	615	1039
5	White Wyandottes ..	17	16	31		
		18	9	18		
		19	3	6		
		20			446	810
6	Buff Orpingtons ..	21	6	12		
		22*				
		23	8	16		
		24	9	18	378	749
7	Plymouth Rocks ..	25	6	11		
		26	8	10		
		27	7	13		
		28	8	10	495	796
8	Buff Orpingtons ..	29	10	16		
		30	12	23		
		31	10	19		
		32	13	25	407	755
9	Brown Leghorns ..	33	2	4		
		34*				
		35				
		36	20	38	433	835
10	Buff Orpingtons ..	37	11	20		
		38	12	24		
		39	9	17		
		40	10	18	456	870
[illegible]	White Leghorns ..	41				
		42				
		43	12	24		
		44			414	813
12	Buff Leghorns ..	45*				
		46	15	30		
		47	13	25		
		48*			362	674

*Dead

Western Province Agricultural Society's Egg Laying Competition—*continued.*

Pen. No.	Breed.	Pullet No.	1st to 31st March.		Total per Pen.	
			Eggs.	Points.	Eggs.	Points.
13	Buff Orpingtons ..	49*			432	829
		50	9	18		
		51	10	18		
		52	12	21		
14	Buff Orpingtons ..	53	3	5	466	851
		54	10	16		
		55	5	7		
		56	7	14		
15	White Wyandottes ..	57	13	20	340	564
		58	10	20		
		59	4	8		
		60*				
16	Black Orpingtons ..	61	1	2	398	792
		62	6	12		
		63				
		64	13	26		
17	Buff Orpingtons ..	65	11	22	385	651
		66	10	16		
		67	9	10		
		68	11	22		
18	White Leghorns ..	69	6	11	461	887
		70	12	24		
		71				
		72*				
19	Brown Leghorns ..	73	2	4	499	864
		74	6	12		
		75	8	8		
		76	2	4		
20	White Leghorns ..	77	1	2	372	718
		78	5	10		
		79*				
		80	6	11		
21	White Leghorns ..	81	1	2	254	488
		82	2	4		
		83				
		84	4	6		
22	Buff Orpingtons ..	85	4	8	411	701
		86				
		87	9	14		
		88	13	18		
23	Buff Orpingtons ..	89	18	23	459	839
		90	11	22		
		91	2	4		
		92				
24	Plymouth Rocks ..	93	10	18	352	521
		94*				
		95	15	21		
		96				

In scoring, 2 points are given for every egg weighing over 1¾ ounces, and 1 point for every egg weighing 1¾ ounces or less.

* Dead

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20 h of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible.

All letters or contributions should be plainly addressed: "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication.

Farmers and Agricultural Shows.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—There has been considerable discussion recently—both written and spoken—on the subject of agricultural shows, and the lack of interest shewn in many districts by farmers, who might certainly do more to patronise and support them.

It is urged that townsmen, and more especially commercial men, contribute largely to the funds, and give much of their time to make these shows a success, and that it is a difficult matter to get country members of the committees to attend meetings. There is a great deal of truth in that statement, but the causes are many and unavoidable. Short notice is often given of these committee meetings, which gives the country member no chance of attending, or he may be up to his neck in work which he cannot leave to native servants, or, as often happens with a man whose property is not all in one block, he is away from home. Thus, the whole onus of getting up the shows rests on those who are closer at hand, nor can the difficulty be easily overcome. Now let us consider whether it is worth the townsman's while to continue to find funds, and give his time for what—on the face of it—seems to be for the advantage of the farmer only. In the first place neither the seaports nor inland towns subsist on the trade of the adjoining Colonies only, but are largely dependent on the productiveness of the districts around them. Everything produced from the soil, whether wool, mohair, ostrich feathers, beef, mutton or grain, adds to the wealth of the districts in which they are produced, and the greater the wealth in the district the more may be expected to flow into the town itself. Therefore, it is in the direct interest of the townsman to do all he can to promote the productiveness of the districts in which he is interested, and agricultural shows are certainly one means to that end.

There are, no doubt, many points on which agricultural societies and shows may be improved. First the societies are, or should be, educational institutions, and the shows at which prizes are awarded, the tests of success. Many young farmers who attend these shows complain that they are unable to follow the points on which the judges have awarded first prizes to animals where the second prize animal seems to be quite equal to the other. A short extract from the judge's report might, if posted with the prize card, help to clear away this difficulty. In fact, judges might be requested to report specially on first prize animals.

Another point on which townsmen will certainly agree is that farmers are relax in subscribing funds. All should pay an annual subscription. Exhibitors, of course, pay, and prize winners should contribute in proportion to the prizes won.

Again, shows held in second class towns should be restricted to local exhibits, and be earmarked as district shows, and would, no doubt, be well supported by local farmers.

No town, either large or small, is willing to give up its annual show, but, it has been pointed out by the Secretary for Agriculture and others that there are far too many first class shows, at which the principal prizes are carried off by one set of exhibitors who travel from show to show with stock of the highest order, against which local exhibitors have no chance, and this, of course, has its effect, and prevents many local entries from being made.

How to remedy this overgrowth of big shows is a question for the Agricultural Union to deal with.

There is another matter in which the societies might do more than they at present attempt to do. They all hold annual general meetings, at which general and financial statements are made, and other matters discussed. Taking the societies to be educational bodies, why not hold more frequent meetings? say, once a quarter, and in addition to ordinary business, invite some competent man to read a paper on some subject connected with the industry of the district, such as that read by Mr. A. C. Murrell a few months ago at a meeting of the Zwart Ruggens Farmers' Association? Such a paper will bear reading many times, and there are hundreds of kindred subjects which would afford matter for similar papers, and would be appreciated by both townsmen and farmers alike. To secure large support, general meetings should be open to the public. It has been urged that such papers should be read at Farmers' Association meetings only; that is a mistake, for although always acceptable they are few and far between, and farmers' meetings are mostly occupied in discussing such matters as stock thefts, native squatters, fencing, jackals, scab, ticks, disease of stock, and fifty other troubles which they annually send to Congress; but none of them are of an educational character. An instructive paper will always go a long way in securing a good attendance, and the experiment is certainly worth the trial.—Yours, etc.,

R. WARREN.

Avoca Villa, Kei Road, March 17, 1907.

Molteno Drift Sands.

To the Editor, AGRICULTURAL JOURNAL.

SIR.—I was very interested in the article called Drift Sands and their Reclamation, but I do not agree with Mr. Vice in saying that the drift originated from what was formerly a spring on the farm Riet Kuil. As I know myself, and have heard from good authority, the drift originated through the grass having been burnt in early spring in order that the owner may have some green feeding for his lambing ewes. This happened in the year 1865, which year, it will be remembered, there was a severe drought, so what with drought, fire and the free run of stock, the grass naturally had no chance, thus more than half dying, and what remained was soon covered up by the sand drifts which were blown about by the north-west drought winds which were blowing so often at that time.

I have often passed over the farm and noticed that in a good season the grass is very much inclined to grow, but on account of the stock having free run it is killed down as fast as it grows. Thus, I quite agree with you as far as fencing is concerned. Vouching we have fairly good seasons, I am positively sure the owner would reclaim the ground within five years, that is, if he paid proper attention.—Yours, etc.,

BURGHERSDORP FARMER.

Burghersdorp, March 17, 1907.

Water Drills and Water Boring.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Some few years ago I noticed a good deal of correspondence in the *Agricultural Journal* on the relative merits of the diamond and percussion types of water drills, the agents for the diamond drills claiming precedence for their machines over all other types, and the agents for the percussion drills claiming all advantages for their machines. At the time when this correspondence appeared, I had no personal knowledge of drills of any sort, so could not express an opinion one way or the other, but as I recently had both kinds working on my farm I can now give an opinion with some assumption of authority. I now unhesitatingly put down the percussion drill as an absolutely worthless machine, and I regret that the Government should be withdrawing the diamond drills in favour of these. It is a mistaken policy.

When we farmers get steam water drills upon our farms we are immediately assailed by visions of artesian water flowing on the surface of our land, and a hundred fold increasing our abilities for successful farming, and adding greatly to the value of our farms. Such were my ideas when in June last a steam Jumper drill arrived on my farm. I started boring operations at a spot I had carefully selected in years past, and where I am confident a strong supply of underground water exists. All went well until we got to a depth of forty-eight feet, when rock was struck, and immediately my castles vanished into the thinnest of air. The drill was kept going for about a fortnight on this rock, making progress at the rate of *one inch* per day! As progress at this rate was impossible we had to discontinue. Being very anxious to pierce this rock, I appealed to the Government for a diamond drill, and after a little delay one was sent. The diamond drill went through the rock with comparative ease, doing from three to six feet per day, putting the superiority of this machine over the percussion drill beyond the shadow of a doubt.

I tried a second hole with the percussion drill with the same result. At twenty-four feet rock was struck, and the hole had to be abandoned.

From my experience, as above stated, I wish to point out this fact, that it is utterly useless, and putting farmers to a useless expense, to employ drills which cannot pierce rock. We may take it as an axiom that no type of drill is of any value that cannot pierce every formation found in the earth's crust. In Australia and other parts of the world bore holes are put down to depths of two to three thousand feet, and rivers of water are running from bore holes, reclaiming millions of acres of waste lands. I don't for a moment suppose that such boreholes are put down entirely in soft formations. We are told the percussion drills can work to a depth of a thousand feet, but is it likely that such a depth can be reached without striking rock, in which they are useless?

The Government has voted a large amount of money for the subsidising of these percussion drills. Half the cost of boring is paid by the Government to a maximum of 8s. per foot. The contractors only undertake to bore in soft formations, and the farmer must pay whether water is struck or not. In every instance the maximum charge is made of sixteen shillings a foot. I am told that in soft formations progress can be made at the rate of from twenty to one hundred feet per day! It will, therefore, easily be seen the profits which can be made by the contractors; and does the country benefit for all this expense? These percussion drills have been working for over two years in this district, and I cannot say that I know of a single farmer who has benefited to the extent of his outlay, and many, like myself, have had no benefit at all. These drills only scratch the surface of the ground, and all the results obtained by them could equally well have been obtained by ordinary well sinking and at less cost to the country. It would be ten times more sensible for the Government to subsidise farmers for well-sinking than to subsidise a type of drill only capable of working soft formations. Give us drills which can be put down to open up water from deeper levels than can be reached by well-sinking, or give us none at all. The present system is simply taking money out of the pockets of the farmers, for which they obtain no equivalent value, and the Government is spending large sums without any benefit to the country. I don't see why this country should not have artesian water, the same as any other, but certainly we will never discover it by using drills incapable of working through hard formations.

I believe that the diamond drill is being discarded on the score of expense. Surely it is benefit to the country, which should be considered, and not expense.

At present large amounts are being spent in filling the pockets of contractors with little benefit to the country; even if the diamond drill is twice as costly as the "Jumper," let us have something done, which will benefit the farmers in the dry districts of the country by opening up water from deep and permanent levels, and not scratching the surface as at present, which may just as effectively be done by well-sinking without any cost to the country.—Yours, etc.,

W. H. WAYLAND.

Fort Richmond. March 16, 1907.

Foot Rot or "Klauw Ziekte" in Sheep.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Footrot or "Klauw ziekte" has made its appearance amongst my Cape sheep and Angora goats. Will you, please, let me know, as soon as possible, if you have a remedy, and what it is? Also what causes footrot? I have over 200 cases amongst my stock, and would like to do something effective for these poor animals.—Yours, etc.,

A. R. INNES.

Nelspoort. March 7, 1907.

This subject has been frequently referred to in the *Agricultural Journal,* but may be described again for the benefit of those who have not got the earlier issues. This disease of the feet of sheep and goats arises under different conditions, and is due to a variety of causes, such as "ticks" getting into the cleft between the "klauws;" the needle-like awns of the varieties of "steek-grass" getting into the same situation; by the feet stripping through the grass, especially when it is wet; or any other irritating substance getting into the cleft between the toes. "Klauw-ziekte," or inflammation of the feet, is also very liable to follow "Blauw-tong"—malarial catarrhal fever of sheep. The inflammation in such cases generally commences around the coronet, and spreads downwards. In Karoo districts, or where the mimosa or other thorny plants are abundant, acute inflammation and the subsequent formation of matter is very frequently due to small thorns having penetrated through the horn into the sensitive parts of the foot. A careful search should, in such situations, be made for thorns, as they often penetrate so deeply into the horn that they cannot be seen above the surface. Foot-rot is generally more prevalent in wet, soft pastures, especially where the vegetation is luxuriant. It is also very liable to occur in soft, sandy pastures, in which there is a tendency to a rapid increase of the growth of the hoofs, without a corresponding wear. Too little attention is paid by flock-masters in this Colony to the over-growth and deformed condition of the hoofs of sheep and goats. Foot-rot may, therefore, follow from any injury or irritation which is capable of producing inflammation of the feet. But in addition to all these accidental causes of foot-rot, it is now well recognized that there is a contagious form of foot-rot, which Professor Brown says "can be distinguished from all other forms of foot disease of the sheep with ease and certainty; and the practical man searching for signs of the affection looks at the skin between the hoofs, and seeing a little moisture or white discharge, with very minute pimples covering the skin, is aware that the disease exists. Daily observation will prove that the disease of the skin sometimes advances rapidly and assumes a very marked character, the whole surface becoming covered with elongated, warty growths. In most instances the inflammation extends to the inner side of the internal structures of one claw, and the hoof becomes disconnected with its membrane, which is covered with long fungoid growths, as they are called, in reality horn fibres so rapidly produced that they are wanting in solidity. The whole product of the morbid state is indeed a mass of epithelial cells. When the disease runs its course unchecked, the horn of the diseased claw is loosened from the inner surface, and in a short time is entirely thrown off, and a new hoof begins to grow from the coronet downwards. If the hoof is not thrown off quickly, it grows with rapidity, and is more or less distorted in form. The contagious foot-rot can only be distinguished from the other varieties in the early stages of the disease, before the changes occur, which are common to all forms of the disease.

The curative treatment of foot-rot is very similar, whatever the cause may be, and is somewhat as follows:—Pare down the sole of the foot to its natural size and shape, as far as can be safely done without making it bleed; carefully examine every part of the hoof for thorns or any foreign body, and clean out thoroughly, any dirt or cause of irritation between the klauws. In more advanced cases carefully remove all loose horn and diseased matter from the affected parts, and apply a strong antiseptic dressing, such as:—

Finely powdered bluestone—one teaspoonful.
Stockholm tar—one tablespoonful.

Mix and apply to all the affected parts, and repeat the dressing at intervals of three or four days, as may be required. A strong solution of any of the tar or carbolic acid sheep dips answers very well.

After the feet have been carefully pared and dressed in this manner, if there are many affected, future dressings may be effected with less trouble by making a shallow dip, and driving the affected animals through it daily. Some recommend placing a quantity of finely powdered lime on a dry floor, and driving the affected sheep over that every second day or so.

If it can be arranged, the affected sheep or goats should in all cases be herded or camped by themselves; this prevents the liability of spreading the infection amongst the flock, while the affected animals do much better by being allowed to graze quietly, and not tortured by being compelled to follow the remainder of the flock. They are much more likely also to get proper attention when all together, and under the eye of the master or superintendent daily.—D.H.

Lamziekte at Knysna.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—While this lamziekte problem is still fresh in our memories, I should also like to make a few delicate observations on the subject. The other day a cow died here from lamziekte. Well, as the disease has never been known to break out on this farm, and as these cattle have not been in contact with any strange cattle, I was naturally puzzled to know from where the disease originated. Nor to the best of my knowledge is lamziekte prevalent in this district.

However, the other day I was in conversation with a neighbouring farmer, and he informed me that some years back he used to lose a lot of cattle every year from lamziekte, and since he left off burning the bush, kloofs and veld round the bush during the month of February he has never had a single case of lamziekte. Between broken-legged frogs and ticks I think myself that a certain form of lamziekte is caused by plants becoming injurious when burnt a certain time of the year. I trust our Veterinary Department will solve the matter to the satisfaction of all parties.—Yours, etc.,

F. FRANZSEN.

Wijnandskraal, Knysna, March 11, 1907.

Rainfall Records.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In three months, fifteen inches of rain has fallen here. I think the whole of the Eastern Province has been equally fortunate. Many old and experienced farmers maintain that in past years this amount of rain was not exceptional, whilst others, equally old and experienced farmers, say they have never known such rains before.

Can you ascertain from the meteorological records whether the past three months' rain constitutes a record or not.

Local rainfall.—

	inches.
September 18th to 24th	3.36
October 7th to 14th	4.31
November	4.37
December 1st to 12th (still raining)	3.10
Total	15.14

A reply in your correspondence columns will great oblige.—Yours, etc.,

CHARLES J. VEITCH.

Goudfontein, P.O. Roodehoogte, December 14.

Mr. C. Stewart, Secretary of the Meteorological Commission, kindly supplies the following:—As a type of the area in which Goudfontein is situated, I have looked up the records for Graaff-Reinet Gaol, which date back to 1861, with the following result:—

In 1906, the rainfall records there were:—

	inches.
September	1.80
October	2.96
November	1.75
December	2.37
Total, September-December	8.88
„ September-November	6.51

Owing to the manner in which the query is put, it is difficult to find an answer, as I do not exactly understand if it is meant to be enquired if the record amount is to be confined solely to the three months September-November, or if it refers to any three months. However, the following may be sufficient answer.

The amount of 1.80 inches in September, 1906, at Graaff-Reinet Gaol has been exceeded on six previous occasions, the maximum for that month being 5.20 inches in 1892 (September).

The October total (2.96 inches) has been exceeded on five previous Octobers, the largest being 4.15 in October, 1863.

The November total (1.75 inches) has been exceeded on fourteen previous occasions, the record for this month being 4.50 inches in November, 1891.

The December total (2.37 inches) was exceeded on nine previous occasions, the maximum being 6.55 inches in December, 1874.

Taking the total of these three months in 1906 (September-November), 6.51 inches, this amount was exceeded in four previous years, *viz.*, 1905, 6.90 inches; 1892, 7.30 inches; 1901, 8.64 inches; 1863, 8.78 inches.

The four months' total, September-December, 1906 (8.88 inches) was exceeded in 1874, when 11.64 inches fell in the corresponding months, and in 1889, when 9.09 inches fell in October-December, there being no rainfall in September that year.

Taking any four months of the year, the record amount, as far as I have been able to ascertain, was 14.49 inches, from January-April, 1876. I trust this information may suffice.

Utility of "Homers" in the Country Districts.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Will you kindly allow me a little space to set before our farmer friends the benefits to be attained by keeping Homer pigeons?

A subject continually cropping up at Farmers' Congresses is the means of obtaining better communication in the country districts. Now, Homing pigeons have been referred to on these occasions, but in such terms as to indicate that the real practical utility of these birds is not fully realized.

If the farmer once understood and believed that the breeding of Homers is a comparatively easy matter, and that their return to their lofts, when properly trained, is practically certain, he would surely grasp what a useful and cheap means of communication lies within his reach.

Take the case of a farmer at a considerable distance from home. What is easier than for him to take half a dozen birds in a basket to the town or railway station, for which he is bound, and despatch them as need may arise?

Or, again, an overseer is left in charge of a farm, and wishes to report at intervals to his employer. The latter takes over a basket of birds which can be released at regular periods with the required messages, or a loft can be kept at both ends, and birds exchanged, thus establishing a regular post. The same would apply to friends living at a distance, and would undoubtedly add greatly to the interest of country life. The farmer's birds would cost him practically nothing to keep.

A most important development would be the establishing of lofts at the different Magistracies throughout the country, whence birds could be furnished to the Mounted Police and Divisional Surgeons on their rounds. There can be no doubt that circumstances must frequently occur when the benefit of such a rapid and certain means of communication would be simply invaluable.

When I say it is an easy matter to breed and train Homers, I am not thinking of the bird which competes in a 500-mile race against dozens of others and wins, perhaps, with only a few minutes in hand. What I have in mind is the bird which is perhaps only moderate in point of speed, but can be relied upon to turn up at its loft and for such distances as would be required, say, up to 100 miles. It would be quite easy to obtain such birds, even in the first season of breeding.

Of course, it goes without saying that good blooded birds are needed for a start, and fortunately there are plenty such to be had in the Cape Peninsula, and at very moderate prices.

A good example of the practical use of Homers was afforded by the saving of several lives from a wrecked dredger off the Natal coast some months ago. The rescue was due solely and entirely to the fact that the captain of the boat had several Homers on board, and despatched them with appeals for help.

Now I do not claim any originality or credit for my suggestions, which probably have been put forward before, nor am I in any way interested in the breeding or sale of Homers, but I do think the fact that our country friends have a remedy in their own hands for their isolation, needs to be brought home to them.

I do not wish to infringe upon your space with details as to breeding and training, which would naturally be of some length. Suffice it to say in brief that the breeding season usually commences early in May, and the training of the young birds in November. It will be understood that the stock birds are not allowed freedom, as they would return to their loft. An interesting case of the strong Homing instinct common to well bred birds was recently shewn by some of the stock birds belonging to Mr. A. J. Savage, late of Woodstock, near Cape Town. After residing several months in Bloemfontein, and breeding from the birds in question, Mr. Savage ventured to let them out for a little exercise, whereupon they at once made tracks for their old quarters, turning up there, I believe, in almost record time.

I shall be happy to furnish the addresses of club secretaries to any enquirers, and am sure these gentlemen would be glad to reply to any questions *re* stock birds, or in regard to breeding and training.—Yours, etc.,

J. LINCOLN LEAK.

Observatory, near Cape Town.

Manuring of Citrus Trees and *Mal di Gomma.*

To the Editor, AGRICULTURAL JOURNAL.

SIR,—That interesting letter of "Citrus Grower's" in the February *Agricultural Journal* has one part, in reference to the mode of manuring, which, as it reads, might lead astray. It says "plenty of manure laid in saucer-shaped excavations round the stems, then filled with water." This might be harmless in well drained, sandy soil, like that of "Citrus Grower's." But in any case it is risky to put rotting manure round the stems of orange trees. No putrescible decaying manure in a depression around the tree stems or trunks is safe, especially when water is allowed to come near the stems. There is abundant evidence of danger from *Mal di Gomma,* when such plan is followed, and it is not the place for the manure. That should be by the root hairs or roots proper that do the feeding, not the stem or large leaders to the roots proper.

The lesson, as given in the October *Agricultural Journal* of the experience of Mr. S. W. Burgers, of Piquetberg, is a telling one on this point—the danger of placing manure and watering round about the tree trunks. A fine orange grove, yielding him £700 a year, was killed off by this pernicious plan of putting manure and water about the stems of the trees. *Mal di Gomma,* or Collar Rot, attacked the lot, and gradually the whole orchard was destroyed.

Why this sorry work when it has been so conclusively shewn that Collar Rot does not affect trees in suitable, well drained soil, as was Mr. Burger's, when manure and irrigation water is kept away from the trunks of the trees?

To shew what little heed was given to this, we are told that Mr. Burgers (later on, after losing his valuable grove) started a new one of 350 young trees, seedlings, and killed these in a few years by placing close about their stems kraal manure, which, of course, he irrigated around the trunks and killed his young grove off. We have much talk about resistant stocks, but should remember the oldest and the finest orange groves are seedlings. Neither these nor the much vaunted resistant stocks for trees are proof against such miserable, unsound treatment. It is not the kind of manure, nor the quality, but the wrong way of applying it about the trunks of trees, as Mr. Cellie, in the December *Agricultural Journal,* remarks that is so risky for Collar Rot. Fine trees of all stocks have perished from this unsound treatment, and where manure and irrigation water are kept away from the tree trunks, *where they are not wanted, Mal di Gomma* is kept away also. Good and safe feeding around the trunks can be got by burning takken and bones together, heaping the ash and charred remains around the trunk with as much loose soil as will keep off all irrigation water.—Yours, etc.,

W. ROE.

Graaff-Reinet, March 6th.

Yellow Liver in Ostrich Chicks.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—There is no doubt that the yellow liver in ostrich chicks is a fever, very similar to the blue tongue in sheep. My experience of thirty-three years has taught me that it is a very infectious disease. I used to lose hundreds of chicks by it. Too much nursing and being kept in boxes is the evil. Shut up at night, or partly so, still they go off every day. The boxes become highly infected, and not thinking of this, the next broods are put into the same box. Result, the same. I believe the room in which the boxes are kept becomes infected. Since we have trusted the chicks to the parent birds they have done ever so much better; only putting the birds with chicks into an open kraal, in case of wet into an open shed. I can't help thinking that the Tampan (Zwart Louse) takes the place of the coast tick in giving red water to cattle. The Tampan bitten fowls appear to suffer in the same way. The little brutes having feasted on a sick chick, pass to a healthy one. The result is yellow liver. Every farm in the Colony is infested with Tampans. Our Entomologist can explain all that. My advice is keep your ostrich chicks away from places in which fowls roost. The Tampan will live for years in old walls, wood, or under stones.

Hoping that this short paper will be of some use to my brother farmers.—Yours, etc.,

W. E. MURRAY.

Roode Bloem, Graaff-Reinet.

P.S.—All boxes in which yellow liver chicks have been put should be burnt, and the room fumigated with sulphur, and whitewashed.

Linseed Oil—Boiled and Raw.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In dosing a beast when bowels are stopped raw linseed oil is the recognised thing to employ as a purgative. The other day I had occasion to dose a cow for the above, and, not having raw linseed oil, used boiled. A friend told me this was a very dangerous thing to use, and might even cause the death of the beast. As I can scarcely credit such a statement, more especially in the face of having cured the cow I dosed, I would be glad to have an authoritative statement.—Yours, etc.,

"PERSEVERE."

P.O. Dwaal, 19th March, 1907.

In this case the friend was perfectly right. Raw linseed oil is an excellent purgative, and carries no risks. Boiled oil, on the other hand, acts as an irritant, and is a very risky thing to use. The "cure" evidently contains the elements of luck.

Arsenical Dip for Goat Scab.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I note in your March issue that Sheep Inspector Muir considers arsenic, soft soap and caustic soda a certain cure for goat scab. He might have added: That in advanced stages it is also certain death for the goat.

The best possible dip for goat scab is lime and sulphur, and it has the advantage of being non-poisonous and can be made to any strength without affecting the health of the animal dipped. Some months ago an instance of goat scab came under my notice which was cured completely by twice dipping in lime and sulphur about 2 per cent. stronger than the Government preparation. The infected goats were kept in the dip ten minutes by the watch, and those not visibly infected from four to five minutes.—Yours, etc.,

ANGLO AFRICANDER.

Jan de Boers, 23rd March, 1907.

Horse Sickness.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—We had a very severe outbreak of horse sickness in the native territories from February to May, 1905; and, as my impression of the disease was so opposed to the official and general opinion, I shall be glad if you will let me mention some facts and deductions, so that other observers may be on the watch to confirm or disprove when the disease crops up again.

There had been no widespread outbreak for about twelve years—shortly before I came to the territories, but three or four horses died in one locality in this district late in the autumn of 1898 from horse sickness, it was surmised, and in Inzikiziki district, I am informed, there was a local outbreak in 1897. As regards the district of St. John's, one correspondent says the disease returns year after year, no exact details available. Another, who ought to be quite as well informed, had not heard of any deaths since the great outbreak. There is always a little uncertainty about the real nature of a disease, when only a few horses die, and the diagnosis is made by natives.

Up to the 12th January, there had been a long drought, and during that time it would be impossible for insects *buried in the soil* in the pupa stage to escape in the winged condition. Before the end of January the first death occurred at Umgazi, in St. John's District; soon afterwards the first case in Ngqeleni (the intervening district) was reported; the disease soon crossed the boundary, and on 10th February the first horse died in this district. The disease spread far inland along the post cart routes, killing both horses and mules, and along the coastal districts eastwards, but did not reach Natal to attract notice till the volunteers' Easter encampment (April 23rd), when many horses died as they scattered homewards.

Our boundary, the Umtata River, in the rainy season can only be crossed at certain drifts, if at all; and it was noticeable that the horses died off near these drifts before those where the river was impassable had become infected. The disease crept slowly over the district, and one part, grass-land, and furthest from the points of entrance, entirely escaped invasion. At the Magistracy, where horses had been brought from infected areas, the mortality was pretty heavy in the beginning of April, but it was still worse in the mimosa bush land nearer the coast, where the disease in places entirely swept off all the natives' horses. On April 8th, during an off-saddle, a short distance from the Magistracy, I noticed a strange fly about our horses. It was active on the wing, of a reddish brown colour, and I imagined it was a new botfly, as the female had an elongated abdomen curled underneath it like the ordinary yellowish green botfly, which is, however, quite a third smaller than the brown fly. Besides the difference in size and colour, I found the newcomer had a strong straight proboscis. I watched to see whether cattle were attacked, but never found it amongst them. It was fairly common where there were horses and sheltering shrubs. I do not mean that it was to be seen frequently, but I certainly saw them oftener than I do botflies in ordinary years, when, nevertheless, every horse in the district is speckled with hundreds of eggs.

While watching a dying horse, I noticed that the male was sucking the horse's flank, where the hair was plastered down with sweat, while the female *apparently* was depositing eggs on the shoulder exactly as a botfly does. On another occasion two males and a female were killed while sucking the carcase of a dead horse.

The male fly was identified by the Natal Government Entomologist as one of the *Tabanidae* or Gadflies, which have none of the habits of the botfly (*Oestrea*), and never lay eggs on horses. The only female fly secured was unfortunately crushed in the post, so that its elongated abdomen was not seen by any authority on insects. So far as I am aware, however, the female in other species of this family has not this resemblance to the botfly.

On May 3rd, there was a cold and very high wind blowing to seaward, and soon after I noticed that this new fly had disappeared. Up to then the disease had shewn no signs of abatement, but not long after the gale the outbreak was completely at an end. The Magistrates and others in the neighbouring districts kindly furnished the dates of the last known deaths. They read: "May 4th," "May 8th," "May 13th," "May 27th not over yet." In this district a laggard case is said to have died on May 20th, but the outbreak was considered quite over before that, and in Ngqeleni one of the foresters is said to have lost his fourth horse as late as June 9th, but I have no information to shew that the symptoms in these cases were unequivocal.

Dr. Edington proved experimentally that the length of the incubation period varied slightly according to the amount of virulent blood injected; and, since the onset of symptoms depends on the accumulation of toxin in excess of what the vital resistance of the animal can neutralise, there is evidently room for further variation. But the normal period is, I believe, about sixteen days from infection on the veld to death. That is inferred from the fact that my horses when out grazing together with the horse of a newly arrived visitor were in contact with a sick horse that died the same night, that my visitor left early next morning, and that his horse and one of mine died at the same time, sixteen days later. The coincidence was too exact to be accidental. None of my other horses died. A single death among a number of horses was not uncommon. In all such instances the dead horse had returned from an infected area, or, like mine, had been in contact with the disease by day.

Now, mosquitoes flit from victim to victim, and are nocturnal feeders chiefly: the stables and sheds here are full of mosquitoes and fleas all the year round, but contact of sick and sound horses in the stable never caused infection. When a horse was taken out of the stable in the morning, sick and dying, his stable companions were none the worse. Had mosquitoes been capable of conveying the infection that could not have happened. The fact was that no horse died which had not been in such circumstances that it was possible for it to have been stung by an infected fly during the hours of sunlight!

Prophylactic medicine and preventitive measures are apt to be plausible rogues! We had so much of that at rinderpest in the pre-serum days. Brown and Jones were dosing their cattle with a root and had not lost a beast; but invariably when the disease did arrive their cattle died off like other people's. Nevertheless, on this occasion, we dosed our horses with arsenic, with quinine, with sulphur, with urotrophine; we took their temperatures night and morning (and learnt incidentally how a healthy horse's temperature can fluctuate); we did everything we were told, and everything we could think of; and then, when the disease came along we buried our horses. Some put one or two bottles of dop into them before burying them, but that was a detail, and "the sure cure" did not even delay the inevitable.

I do not see why horse sickness should be considered a malarial disease. It cannot be called endemic, a disease of locality, when it comes at such long and erratic intervals. Nor is there anything to denote that the microbe has the slightest kinship, morphologically, to the two-phase parasite of human malaria or bovine redwater. Horse sickness, apparently, cannot spread without the assistance of an insect intermediary, but, apart from that, it extends over the country just as any epidemic spreads among human beings.

We have still much to learn. But I think any open minded critic will allow that the simultaneous occurrence of a new disease and a new insect is highly significant, especially when the disappearance of the fly was so rapidly followed by the cessation of the outbreak. There is nothing to shew that all the flies were infected, or that infected flies retained the power to convey infection for a long time, as is the case with the mosquito of yellow fever. But how did the first fly become infected? The virulence of horse sickness is very lasting; could a fly or flies in grub or pupa stage become infected in the soil where some horse had died and decomposed in former years? Such a hypothesis might explain the fortuitous occurrence of the disease at long intervals, but not the abundance of the fly one year and its complete absence during all the previous years. I have heard of a fly similar in appearance occasionally in other years annoying horses in the Ixopo district, in Natal. This fly here, however, did not excite the horses at all. Possibly our fly may occur regularly in small numbers in certain localities, and only exceptionally spread over the country in abundance. Be that as it may, I appeal to all readers to watch and to catch specimens for our Government Entomologist whenever and wherever such a fly occurs coincidently with an outbreak of horse sickness.

In a recent number of the *British Medical Journal*, Captain Markham Carter mentions as noteworthy the occurrence of horse sickness in Arabia within a few miles of the haunts of a tsetse fly (*Glossina*).

If we have the disease again, I shall rub down my horses every morning when they go out with Little's dip or any other vile smelling solution that will not hurt the skin, and when an animal is found to be sick I shall try hypodermic injections of strychnine to stimulate the vaso-motor centre that regulates the blood vessels, and so try to tide over the dropsical stage. But with such a deadly disease I doubt whether any drug would do any good. Strophanthus and Amylnitrite (recommended in wet Beri Beri) were in this disease absolutely useless.—Yours, etc.,

P. N. WALKER.

'Nqanduli, March 4th, 1907.

RURAL REPORTS.

Aliwal North, 15th March.—Good rains have fallen during the period and the general outlook is promising. The veld is in better condition than it has been for many years past and the grass is in seed all over the district. In some parts of the district cereals are doing very well, in others they have been destroyed by locusts. Stock generally doing very well.

Bathurst, 12th March.—Weather very hot and dry with light rains and veld not doing very well. Vines doing well and pine apples very plentiful. Crop of mealies rather heavy. Stock in fair condition.

Bedford.—31st March. Weather calm and inclined to rain, but not so much rain has fallen as did last month. The veld is in splendid condition, although the locusts are doing a considerable amount of harm. The fruit has been damaged very much by the rain, and the vines are not doing well. The mealie crop has been very much damaged by locusts. Lucerne still yielding heavy crops. Stock doing well.

Burghersdorp, 15th March.—Weather very hot and sultry and veld in very good condition. Good rains have fallen during the month. Vines doing well. Cattle and horses in good condition.

Clanwilliam, 8th March.—Hot, windy, cloudy and cold weather has been experienced during the nights with light rainfall. The veld is in fair condition for the time of the year. Vines doing well likewise peaches and apples although the codling moth is in the latter. Lucerne in good condition. Stock generally doing well.

East London, 8th March.—Thunder storms have been experienced but with little or no rain and at other times there have been high winds from East and West. Vines doing fairly well. Apples good, bananas likewise, oranges promise fair. Red scale and black fly in evidence. Mealies have been greatly damaged by the lack of rain, likewise the Kafir Corn. Lucerne doing well where irrigated. Stock generally doing fairly well.

Fort Beaufort, 12th March.—Weather mild and veld in very good condition. Rainfall about the average. Fruit season nearly over; troubled very much with maggots. There has been a good harvest of wheat and oats and the lucerne is in very good condition. Cattle and horses doing very well but sheep are not in quite such good condition, fever being prevalent. Goats and ostriches in good healthy condition.

Hay, 2nd March.—Veld in fairly good condition. Wheat and mealies doing fairly well and stock generally in good condition. Rainfall average.

Herschel, 28th Feb.—Weather very hot and stormy with heavy rainfall. Veld in excellent condition. Peaches in fair condition and what vines there are are doing well. Wheat crop poor, but oats, mealies and Kafir corn promising. Stock generally in good condition.

Jansenville.—Weather warm, with light rainfall, and the veld is in good condition. Mealies destroyed by locusts. Stock in fairly good condition.

Middelburg.—27th March. Warm, dry weather, with ight rainfall. Veld somewhat damaged by locusts. Fruit crop very much damaged by late frost and insect pests. Very few vines. Wheat, oats and barley doing fairly well. Mealies promising. Good crop of lucerne.

Oudtshoorn, 12th March.—Weather very sultry with extremely light rainfall and the veld is in fair condition. Vines doing well although almost invariably there are reports of insects damaging the grapes. Fruit doing well although in some parts considerably damaged by insects. Oats and mealies rather scarce, lucerne doing very well. Stock generally in good condition.

Peddie, 22nd March —Weather hot and very dry with light rainfall. Veld very dry. Fruit season over. Kafir corn very poor. Stock in fair condition.

Prieska, 11th March.—Weather warm and promising, but veld somewhat damaged by locusts. Rainfall variable in different parts of the district. Fruit very considerably troubled with insect pests. Very few cereals. Stock in fair condition.

Queenstown, 15th March.—Weather very hot and dry, and the veld was in very good condition until the locusts came along and damaged it. Rainfall very light. Fruit poor except pears and quinces. Very fair crops of wheat and lucerne. Mealie crop would have been very large had not the locusts come along. Stock generally in good condition.

Robertson, 27th March.—Weather very warm with no rains and the veld is getting dry. Vines yielding a very good crop. Fruit all damaged by the Codl'ng Moth. Exceptionally good crop of mealies and the same remark applies to lucerne. Stock generally in good condition.

Somerset East, 8th March.—Extremely hot weather has been experienced with light rainfall. Veld in good condition. Mealies still but somewhat damaged by locusts. Stock doing well.

Steynsburg, 20th March.—Weather warm and windy with no rains and the veld is dry. Fruit crop good like grain and lucerne. Stock doing well.

Tarkastad.—Weather very changeable with fairly heavy rainfall. The veld shews good prospects for winter except where damaged by locusts. Very few vines. Plenty of all kinds of fruit in good quality. Peaches somewhat wormy but not so bad as usual. Fair crops have been reaped but have been reduced at least half by locusts and hail. Stock generally in fairly good condition.

Upington, 13th March.—Weather fine with no rains. The veld was in very good condition but now has been destroyed by locusts. Peaches, pomegranates and quinces in good condition. Lucerne doing very well. Stock generally in good condition.

THE TRANSKEI.

Cofimvaba, 2nd April.—The standing crops of mealies and kafir corn would be all the better for a little fine weather—there has been rather too much rain during the past month, thunderstorms have been frequent but fortunately unaccompanied by hail. Redwater is still prevalent; five areas were released from quarantine during March and eight areas remain under quarantine besides two for lungsickness and one for farcy but the latter will, it is expected, be released in a few days.

Flagstaff, 1st March.—There is little to add to the last report. The weather has been seasonable, 4·01 inches of rain having fallen during the month. Owing to the wet weather during January the people were unable to weed their lands consequently the mealie and Kafir corn crops will not be so good as was anticipated. The veld is in good condition. Stock of all kinds is in excellent condition. No disease of any contageous or infectious nature was reported.

Lusikisiki, 11th March.—There is nothing to add to previous report. Crops are looking well everywhere.

Mount Ayliff, 28th Feb.—Very hot weather with two or three severe hailstorms Temperature was over 90 degrees in the shade on ten days. Rainfall light and veld in good condition. Fruit nearly over. Cereals promising, and stock generally in good condition.

Mount Frere.—30th March. Seasonable rains have fallen during the month, and the crops promise well, being clean and free from Aphides. Stock is looking well, and the spread of lungsickness is to a certain extent checked. It is hoped that this disease will be stamped out when the new regulations come into force. The veld is in excellent condition, and there is every prospect of a good winter.

Nqamakwe, 2nd April.—The first part of last month was dry and hot but heavy thunderstorms and rains followed towards the end of the month. Dry weather and sunshine are required for the mealie crops to ripen. Outbreaks of lungsickness continue to occur, in other respects the condition of stock is normal. No locusts visited the district.

Willowvale.—31st March. Nothing of importance to add to report for February; 4·45 inches of rain have fallen in the district during the past month, and the veld is in excellent condition. Lung-sickness and quarter-evil are still prevalent in the district. All crops are looking well. Young locusts have appeared in some parts of the district, but strenuous efforts are being made for their destruction.

NOTES ON THE WEATHER OF FEBRUARY, 1907.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission.

Mean atmospheric pressure considerably below the average (0·03 in. at the Royal Observatory), with a mean temperature also slightly lower than usual, a practically normal mean rainfall, frequent thunderstorms, although only about two-thirds as numerous as in January, chiefly on the first of the month and during the third week, a comparatively small number of hailstorms, a considerable reduction in the number of fogs as compared with the preceding month, some strong winds, although the mean force was less than usual, with a few duststorms and hot winds, were the principal features of the weather of February last.

Precipitation.—The mean rainfall during this month, as shewn by the data from 347 stations, was practically the same as the normal, being 2·30 inches, falling on seven days, or only 0·02 inch (*i.e.*, less than 1 per cent.) lower than the average. A consideration of the accompanying Table will shew that, generally speaking, the amount of precipitation increased from West to East and from South to North, the most abundant rainfall occurring in Rhodesia, where it was 64 per cent. over the average. An excess of precipitation was experienced over eleven of the seventeen sections; this varied in amount between plus 72 per cent. over the Northern Border, and 12 per cent in the South-east. On the other hand there was a shortage of rainfall over the Cape Peninsula, the South-west, South Coast, the Northern Karoo, in Bechuanaland and at Durban (Natal) the deficit ranging from 71 per cent. over the South-west, to 10 per cent. at Durban (Natal.) Compared with January last, there was an increase in the amounts recorded over the West Coast, Southern Karoo, East Central Karoo, Northern Border, at Durban, and in Rhodesia, where the mean for this month was about three times that for the preceding month, but a decrease

Division.	Mean Rainfall (1907).	Mean No. of days.	Average Rainfall (1891-1900)	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ..	0·56	5	0·77	3	— 0·21	— 27
South-West ..	0·14	1	0·48	2	,, 0·34	,, 71
West Coast ..	0·46	3	0·28	1	+ 0·18	+ 64
South Coast ..	1·36	6	1·68	6	— 0·32	— 19
Southern Karoo ..	1·16	2	0·71	2	+ 0·45	+ 63
West Central Karoo ..	1·17	3	0·96	3	,, 0·21	,, 22
East Central Karoo ..	2·49	5	1·57	5	,, 0·92	,, 59
Northern Karoo ..	1·16	6	1·72	4	— 0·56	— 33
Northern Border ..	3·15	8	1·83	5	+ 1·32	+ 72
South-East ..	3·14	8	2·80	7	,, 0·34	,, 12
North-East ..	3·50	10	3·05	8	,, 0·45	,, 15
Kaffraria .. .	4·93	13	3·52	9	,, 0·41	,, 40
Basutoland ..	5·61	14	3·94	10	,, 1·67	,, 42
Orange River Colony ..	3·44	8	3·02	7	,, 0·42	,, 14
Durban (Natal) ..	4·06	12	4·50	..	— 0·44	— 10
Bechuanaland ..	3·22	8	4·23	8	,, 1·01	— 24
Rhodesia .. .	13·04	20	7·97	13	+ 5·07	+ 64

elsewhere. On analysing the monthly totals, it is found that of the 347 stations only eight (8) reported "Nil." Whereas 89 had 0·01 to 1 inch, 70 had 1·01 to 2 inches; 69 had 2·01 to 3 inches; 44 had 3·01 to 4 inches; 34 had 4·01 to 5 inches; 17 had 5·01 to 6 inches; 8 had 6·01 to 7 inches; and 5 had 7·01 to 8 inches; leaving three (3) with more than eight inches. The maximum amount recorded for the month was 17·58 inches at Inyanga in Rhodesia; Wanstead coming next with 12·25 inches; the third being Hope Fountain with 8·51 inches. This analysis shews that the rainfall was practically general over the whole country, almost the whole of the stations suffering from absolute drought, being confined to the West and South-west of the Colony. On similarly treating the maximum amounts recorded in 24 hours, it is found that of the 340 stations furnishing the necessary details, 209 had 0·01 to 1 inch; 92 had 1·01 to 2 inches; 27 had 2·01 to 3 inches; and only four (4) with more than three inches; taking these last in order, the largest amount was registered at Katberg on the 28th, when 4·29 inches fell; on the 16th, Inyanga shewed 4·09 inches; Wanstead (East Griqualand) had 4·00 inches on the 6th, of which amount 3·84 inches fell in 25 minutes (4·20 to 4·45 p.m.) a truly torrential rainfall; whilst 3·95 inches were recorded at Glencairn on the 28th. *Thunderstorms* were of daily occurrence, and extended over a wide area, particularly on the 1st, 14th, 15th, 18th, 24th and 31st. In all, 690 cases of these storms were reported as occurring during the month; some of these were very severe and accompanied by heavy rain and *Hailstorms*, of which latter, 35 instances were noted, principally on the 1st. Considerable damage and loss of life was caused either directly by these storms, or by the succeeding floods. Among these may be mentioned the following, which have been partly gleaned from newspaper reports:—During a severe thunderstorm on the 1st, a house was struck by lightning at Olifantspoort, near Johannesburg, a woman was killed by the lightning, but her three children, who were round her on the stoep, escaped uninjured. On the evening of the 2nd, a corporal of the Cape Police was drowned when trying to cross the Buffalo River, near Fort Pater, when returning from Fort Jackson. At Standerton the Vaal River overflowed its banks, with the result that the whole town was under water; whilst one man's body was found in the river, and a woman killed by lightning. Heavy rains had fallen from 3rd to 5th; the maximum amount in the 24 hours being 11·75 inches at Sibosa, in the Zoutpansberg District, on the 4th; there were many narrow escapes owing to the houses falling in and many sheep and cattle were noticed floating down the river. On the 6th occurred the enormous rainfall at Wanstead. On the evening of the 14th a heavy storm passed over Douglas, accompanied by a strong gale, which blew the whole roof off the English church, carrying the iron sheets and woodwork several hundred yards. The roof of the English Native Mission church was also carried away, and native huts and houses blown to bits. A heavy thunderstorm about this time also visited Kimberley. On the 17th a severe hailstorm cut the mealies, etc., to pieces,—1·28 in. being recorded in 20 minutes; this storm is stated to have been very limited in extent. On the 18th a heavy thunderstorm burst over Port Elizabeth, transforming sluits and gutters into miniature mountain torrents but doing no damage. On the evening of the 19th a severe thunderstorm broke over Maritzburg, during which the tram wires were fused; and the body of a native was seen in the Umsindusi River. A similar thunderstorm was reported from Richmond (Natal) where much damage was done to crops, a native being killed, and a horse struck in the village. On the 26th it was reported from Lourenço Marques that the country round the mouth of the Limpopo had been flooded, and the bar silted up; steamers being unable to enter or leave the river. Telegraph lines were down; the Incomati district was reported as being similarly flooded and overland communication with Chaichai impossible. On the evening of the 27th severe thunderstorms over the Willowmore district caused numerous washaways on the Oudtshoorn line and consequent dislocation of traffic. On the 28th the southward-bound train from Graaff-Reinet was stranded between two washaways between Kendrew and Aberdeen Road, and heavy rains were falling in the Transkei. No *Snow* or *Sleet* wasreported. In consequence of the heavy rains, the rivers about Kokstad were all running high and the farmers were experiencing great difficulty in reaping their crops.

Temperature, Cloud and Wind.—The mean temperature for the month of all the stations was 69·9° or 0.3° lower than the average, but 1·5° warmer than in January last. The mean maximum temperature was only 80·4°, the day-temperature being colder than usual by 1·5°; whereas the corresponding minimum temperature (59·4°) was 0·8° higher than the normal. These values show an increase of 2·1° and 0·9° over the corresponding figures for the preceding month. The mean daily range (21·0°) was consequently 2·3° less than usual but 1·2° more than in January. Generally speaking, mean temperature was below the average by 0·5°-1° as in the West over the Cape Peninsula and at the stations of Amalienstein, in the Southern Karoo and at Hopetown and

Kimberley in the High Veld; but the deficit was much greater at the Basutoland stations and at Hopefountain (Rhodesia.) Elsewhere the monthly temperature was above the normal by amounts varying from between 0·2° and 1·5°, including Weltevreden in the South-West and the mountain Station of Disa Head. The excesses and deficiencies in the mean maximum temperatures (i.e. the day-temperatures) show a close correspondence with the excesses and deficiencies in the mean monthly temperatures, except that there was a deficit of 0·6° at Aliwal North and of 0·4° at Port St. John's. An examination of the mean minimum shews that the night temperatures were at or slightly below the normal at Coast stations in the West but above the normal by 0·5°—1° in the South and East as well as in the interior, with the exception of Leribe and Mohalie's Hoek in Basutoland. The differences varied between an excess of 4·4° at Hopefountain and a deficit of 2·7° at Leribe. The mean warmest station was Hopetown with 75·8° and the mean coolest, Bensonvale with 64·0°, a difference of only 11·8°. The highest mean maximum is found to be 89·2° at Amalienstein and the corresponding minimum 47·4° at Bensonvale. The highest temperatures for the month were at one or more stations during the following periods 1st to 5th, 8th to 10th, 13th to 19th, 22nd to 28th, more particularly on the 4th, 22nd and 26th. The mean of these absolute maxima was 89·8° or 1·8° less than in January. Temperatures of 100° or more were confined to the three stations, Sydney's Hope, King William's Town, and Amalienstein where the highest temperature for the month (103·0°) was registered on the 22nd Similarly the lowest temperatures for the month occurred on the mornings of the 1st, 4th, 5th, 7th to 13th, 15th to 21st and on the 21st, but most generally on the 20th, 21st, 10th, 11th and 13th. The mean of the lowest readings was 52·5° or 10·3° higher than the corresponding value for the previous month, the absolute minimum registered being 43·0° at Bensonvale on the 7th. There was thus a mean monthly range of 37·3° and an extreme range over all the stations of 60°. No *Frosts* were reported.

The mean amount of *Cloud* was 41 per cent. being 1 per cent. more than the average but 9 per cent less than in January and 3 per cent. less than during the corresponding month of 1906. The proportion of sky obscured was considerably above the normal in the West over the Cape Peninsula, at most stations in the interior and in Kaffraria but less than usual in the South West, along the South Coast and in the South-East. It varied between 60 and 70 per cent at the actual coast stations in the West, was 40 to 50 per cent. along the South-Coast, increasing to 60 per cent. in the South-East and in Kaffraria. Over the greater part of the interior it varied between 30 to 40 per cent. increasing however to 66 per cent. at Kimberley. The morning skies were most cloudy at Hopefountain where 22 per cent. was obscured and clearest at Groot Drakenstein where the mean cloudiness was only 16 per cent. The number of *Fogs and Mists* reported was only about two-thirds that for January, this phenomenon being noted on 123 occasions on 27 days of the month, the one exceptional day being the 14th. These were most widely distributed on the 5th, 6th, 16th, 1st, and 24th.

The prevaling *Wind-directions* were Southerly over the Cape Peninsula and along the West-Coast, Easterly at Danger Point and Cape Agulhas and Potteberg, Westerly to North Westerly from Mossel Bay eastwards but North Easterly at Durban. Variable winds chiefly Northerly prevailed in the interior, but South Easterly at Hopefountain. The mean wind-force on the Beaufort Scale (0 to 12) was 1·63 corresponding to a mean velocity of 11·2 miles per hour At the Royal Observatory, North Westerly and Southerly winds were equally prevalent in the morning, the mean hourly velocity being about 1 mile less than usual There was a marked diminution this month at that station of winds from those points of the compass lying between South East and South West, also in those from due West, particularly of those from due South, with a corresponding increase of winds from S.W.S. and from W.N.W. round to North. A violent "South-Easter" prevailed at Simonstown on the 3rd causing two dockyard boats to be blown on to the beach. The wind was reported as attaining the force of a gale at 19 stations on 11 days, particularly the 13th, 14th and 18th. *Duststorms* occurred at 2 stations on 2 days and the same number of *Hot Winds* on an equal number of days.

Although the greater part of the country has benefited to a considerable extent by this month's rains, the hot days occurring in the beginning of the month caused some damage to the vines at Vruchtbaar (Wellington District), whilst at Carnarvon Farm about one-third of the mealie crop is stated to have been practically burnt up. The greatest amount of damage, however seems to be due to the presence of enormous swarms of locusts, these being reported from Theefontein, The Meadows, Thibet Park, Dunmurry, Fort Beaufort and Van Wyk's Vlei; these swarms seem to have been moving eastwards and southwards. The veld at Van Wyk's Vlei is reported as swarming with caterpillars, and maggots have appeared in the fruit at Lyndene.

OBSERVERS' NOTES.

Vruchtbaar.—Grape season in full swing; hot days in beginning of month have done very much damage to vine crops.

Theefontein.—Heat never great (80° in house). Have not known so rainy a February for many years. Hailstorm on 17th very severe—mealies, etc., cut to pieces. On the 17th 1·23 inches of rain fell in 20 minutes. Area of storm very small.

The Meadows.—Veld is looking a little better. Locusts have not been in these parts for the past three weeks.

Dunmurry.—The whole Division is overrun with Locusts in hopping stage, but just ready to get their wings, most of them travelling East and South.

Van Wyk's Vlei.—Flocks of Locusts and birds here all day on the 5th going eastward. Veld going off through heat, and is now swarming with caterpillars.

Alexandria.—Mealies the only crop now promising.

Fort Beaufort.—Large swarm of locusts in the District.

Sunnyside (Albany).—Mealies looking splendid. First and main crop can do without rain, but this rain will set up the later sowings, which, owing to intense heat last week, were getting dry. Veld in fine trim.

Carnarvon Farm.—This month has been a repetition of disastrous January when we had only 1·97 inches of rain against most other people's four, five, six and seven inches. The 2·15 inches has been made up of practically useless showers at long intervals. A third of the mealie crop on this place is already destroyed—burnt up Rainy days nine, frosts *nil*, windy days three, cloudless days *nil*. Stock for most part fat; locusts only occasionally appeared.

Jamestown.—Wheat crops fair yield. Mealie crops bid fair to be very good.

Lyndene.—Crops prosperous, especially maize. Veld green. Much damage to fruit through hail on 1st March. Fruit also has maggot.

Thibet Park.—Very hot month, the small, light showers not doing much good, and enormous swarms of locusts about.

Kokstad.—Rivers all running high. Farmers have great difficulty in reaping their crops on account of the rain. Fruit not so good this season. Country in good condition.

Wanstead.—On the 6th there were 4·00 inches of rain of which 3·84 inches fell in 25 minutes, *i.e.* between 4.20 and 4.45 p.m.

Groot Drakenstein.—A warm, very dry and unusually clear month and winds not so strong or frequent as usual. Mean temperature 0·3° above the average (eight years). The days being 1·3° warmer and the nights about 1° colder than the average. Rainfall only 1-10th of an inch and 0·55 inches less than the mean for 14 years. On only one occasion during the nine years has the temperature fallen below 50° in February.

Kokstad.—Frequent thunderstorms, a good deal of rain and a mean monthly temperature rather above the average, marks the month. Rivers remain full, stock in good condition.

Dunedin.—A dry stretch of country, about 15 miles in breadth, falls into our Division from the Fraserburg direction, embracing Dunedin, from which places all stock have fled for pasturage to the Victoria West District.

TEMPERATURE, FEBRUARY, 1907.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ..	78·4	60·5	69·4	89·8	4	54·7	21
Devil's Peak	72·5	55·9	64·2	82·0	4 & 14	51·0	10 & 20
Cape Town (Hospital) ..	76·7	58 9	67·8	88·9	3	52·6	10
Sea Point	78·1	59·7	68·9	91·0	4	55·5	11 & 21
Table Mountain (Disa Head)	68·2	55·2	61·7	78·0	5 & 14	47·5	9 & 20
Wynberg	77·9	59·3	68·6	86·5	4	53·0	21
S. A. College	80·3	60·8	70·6	92·0	4	53·0	21
Simon's Town	79·7	64·1	71·9	88·6	4	54·5	21
Elsenburg Ag. College ..	83·9	57·4	70·6	92·2	3	47·8	22
Robertson (Plantation) ..	89·3	60·2	74·7	99·0	17	51 0	13
Wellington (Hug. Sem.) ..	85·8	63·9	74·8	93·9	25	52·8	21
Groot Drakenstein ..	86·1	60·3	73·2	96·1	25	49·7	11
O'okiep	84·1	58·6	71·3	95·0	13	48·1	20
Port Nolloth	68·0	55·8	61·9	77·0	18	47 0	13
Port Elizabeth (Hill Lightho.)	76·6	64·3	70·4	82·0	2	59·0	11
Cape L'Agulhas ..	74·6	64 8	69·7	78·0	8 & 18	60·0	1,9&20
George (Plantation) ..	77·4	60·3	68·8	91·0	8	54·0	13
Cape St. Francis ..	73·8	64·0	68·9	77·0	15 & 16	55·0	13
Potteberg	79·3	62·9	71·1	94·0	17	57·5	20
Heidelberg	82·6	62·8	72·7	97·0	17	53·0	10
Amalienstein	89·2	60·3	74·8	103·0	22	52·0	20
Hanover	85·2	55·5	70·4	92·0	1	46·0	20
Murraysburg	85·9	58·4	72·2	95·0	22	48·0	19
Kimberley	87·7	61·1	74·4	94·9	10	55·9	20
Hope Town	89·0	62·5	75·8	94·0	22	58·0	21
King William's Town ..	87·5	62·6	75·0	102·0	26	55·0	7 & 13
East London	74·6	64·8	69·7	81·0	5	62·0	17 & 18
Bedford	83·9	59 3	71·6	98·0	28	50·0	11
Sydney's Hope ..	82·8	60·3	71·6	101·0	22	54·0	11 & 12
Aliwal North	81·9	56·9	69·3	90·0	9	52·5	8
Evelyn Valley	76·0	56·1	66·0	89·0	26	49·0	10
Bensonvale Institute ..	80·7	47·4	64·0	88·0	26	43·0	7
Rietfontein (Aliwal North)	80·0	55·8	67·9	85·0	9	50·0	8
Mount Ayliff	83·2	60·5	71·8	93·0	26, 27 & 28	55·0	7
Tabankulu	79·2	57·7	68·4	89·1	19	53 0	20
Umtata	82·2	60·9	71·6	95·0	27	53·0	10
Kokstad (The Willows) ..	78·5	55·4	67·0	86·5	27	50·0	28
Port St. John's.. ..	79·3	67·0	73·1	90·0	19	64 0	15
Teyateyaneng	79·6	53·8	66·7	85·0	23	50·0	4, 16 & 18
Leribe	79·1	54·9	67·0	84·0	9	48·0	8
Mohalie's Hoek ..	79·5	50·5	65·0	85·0	24	44·0	5
Hope Fountain ..	76·7	61·6	69·2	83·0	18	57·3	16
Means	80·4	59 4	69·9	89·8	..	52·5	..
Extremes	..	..	..	103·0	22	43·0	7

RAINFALL, FEBRUARY, 1907.

I. CAPE PENINSULA :	INCHES
Royal Observatory (*a*) 12 inch gauge	0·23
Cape Town, Fire Station	0·17
Do. South African College	0·19
Do. Molteno Reservoir	0·25
Do. Platteklip	0·43
Do. Signal Hill	0·15
Do. Hospital	0·22
Sea Point (The Hall)	0·13
Do. (Attridge)	0·10
Camp's Bay	0·14
Table Mountain, Disa Head	0·84
Do. Kasteel Poort	1·57
Do. Waai Kopje	1·37
Do. St. Michael's	1·50
Devil's Peak Blockhouse	1·16
Do. Nursery	0·88
Do. Lower Gauge	0·72
Woodstock (The Hall)	0·48
Do. (Municipal Quarry)	0·64
Do. (Do. Nipher's Shield)	0·66
Newlands (Montebello)	0·73
Kenilworth	0·25
Wynberg (St. Mary's)	0·36
Groot Constantia	0·42
Tokai Plantation	0·34
Plumstead (Culmwood)	0·31
Simon's Town (Wood)	0·37
Do. (Gaol)	0·29
Cape Point	0·10
Maitland Cemetery	0 0
Tamboer's Kloof (Monte Vista)	0·23
Newlands Res. No. 1, 450	1·33
„ „ „ 2, „	1·03

II. SOUTH WEST :	
Klapmuts	0·12
Stellenbosch (Gaol)	0·[illegible]5
Somerset West	0·38
Paarl	0·10
Wellington (Gaol)	0·09
„ Huguenot Seminary	0·08
Groot Drakenstein (Weltevreden)	0 10
Porterville Road	0·28
Tulbagh	0·15
Kluitjes Kraal	0·26
Ceres	0·28
Rawsonville	0·15
Worcester (Gaol)	0·02
Hex River	0·00
Karnmelks River	0·05
Robertson (Govt. Plantation)	0·00
Danger Point	0·10
Vygebooms River	0·22
Elgin Plantation	0·13
Elsenburg Agricultural College	0·06
Roskeen	0·38
Vruchtbaar	0·20

III. WEST COAST :	INCHES
Port Nolloth (Lieut. Barber)	0·00
Anenous	0 45
Klipfontein	0·59
Kraaifontein	0 97
O'okiep	1 08
Springbokfontein	1·25
Concordia (Kraphol)	1·05
Van Rhyn's Dorp	0·43
Clanwilliam (Gaol)	0·00
Dassen Island	0·0[illegible]
Malmesbury	0·17
Piquetberg	0·24
Zoutpan	0·08
Wupperthal	0·00

IV. SOUTH COAST :	
Cape Agulhas	0·19
Bredasdorp	0·20
Swellendam	0·63
Potberg	0·73
Zuurbrak	1·15
Heidelberg	1·01
Riversdale	0·38
Vogel Vlei	0·10
Great Brak River	1·32
George	1·67
Do. (Plantation)	1·81
Woodifield (George)	2·17
Millwood	2 39
Concordia	3·62
Knysna	1·56
Buffel's Nek	0·94
Plattenberg Bay	1·01
Harkerville	2·02
Blaauwkrantz	2·91
Lottering	1·68
Witte Els Bosch	2·46
Cape St. Francis	0·30
Uitenhage (Gaol)	0 86
Do. (Park)	0 87
Armadale (Blue Cliff)	1·43
Port Elizabeth (Harbour)	0·86
Do. (Walmer Heights)	2·05
Shark's River (Nursery)	1·00
Do. (Convict Station)	1·02
Centlivres	0·75
Edinburgh (Knysna)	2·62

V. SOUTHERN KAROO .	
Ladismith	1·28
Amalienstein	0·74
Calitzdorp	0·50
Oudtshoorn	0 00
Uniondale	0·75
Kleinpoort	1·19

RAINFALL, FEBRUARY, 1907.

VI. WEST CENTRAL KAROO:

Fraserburg Road	0·02
Prince Albert	0 14
Zwartberg Pass	0·15
Beaufort West (Gaol)	0 84
Nel's Poort	1·37
Camfers Kraal	2·63
Krom River	1·55
Baaken's Rug	1·02
Willowmore	2·62
Steytlerville	1·40

VII. EAST CENTRAL KAROO:

Buffels Kloof	3·30
Aberdeen (Gaol)	3·57
Corndale	2 97
Winterhoek	1·64
Kendrew (Holmes)	3 17
Do.	3 56
Graaff-Reinet (Gaol)	1 29
Do. (Eng. Yard)	1·44
New Bethesda	2·70
Roodebloem	1 38
Glen Harry	0 58
Wellwood	2·25
Bloemhof	0·88
Patrysfontein	2·71
Bethesda Road	2·10
Toegedacht	4·02
Klipfontein	2·64
Pearston	3·62
Walsingham	1·45
Middlewater	2·89
Somerset East (Gaol)	2·25
Spitzkop (Graaff-Reinet)	2·02
Bruintjes Hoogte	4·95

VIII. NORTHERN KAROO:

Calvinia	0·19
Middlepost	0·65
Sutherland	0·08
Fraserburg	1·15
Carnarvon	0·41
Brakfontein	1 81
Victoria West	0·95
Britstown	2·93
Wildebeestkooij	1·03
Murraysburg	2·33
De Kruis (Murraysburg)	2·28
Richmond	1·25
Hanover	2·72
Theefontein	3·55
Philipstown	3·49
Petrusville	3·43
The Willows (Middelburg)	1·08
Middelburg (Gaol)	2·20
Do	2·26
Jackalsfontein	1·10
Ezelpoort	0·79
Plaatberg	0·70
Grape Vale	1·03
Ezelfontein	1 41
Roodepoort	0·68
Groenkloof	0·69
Vlakfontein	1·20
Vogelsfontein	1·14
Plaatfontein	1·53

VIII. N. KAROO:—*continued.*

	INCHES
Colesberg	4·13
Fish River	1·98
Varkens Kop	3·07
Culmstock	1·99
Droogefontein	2·06
Cradock (Gaol)	1·90
Witmoss	3 22
Maraisburg	2 95
Steynsburg (Gaol)	2·71
Tarkastad	2·50
Do (Dis. Engineer)	2·74
Waverley	4·39
Schuilhoek	1·40
Vosburg	1·66
Zwavelfontein	1·14
Holle River (Colesberg)	3·41
The Meadows (Schoombie)	1·74
Cradock (Station)	1·70
Arundel (Colesberg)	1·83

IX. NORTHERN BORDER:

Pella	1·75
The Halt	1·78
Kenhardt	2·32
Upington	2·57
Trooilapspan	3·24
Van Wijk's Vlei	1·37
Prieska	2·86
New Year's Kraal	2 50
Dunmurry	5·29
Karree Kloof	3 10
Griquatown	3 11
Campbell	2·84
Douglas	4·19
Hopetown	1·96
Newlands (Barkly West)	2 80
Barkly West	3·11
Bellsbank	4·34
Kimberley (Gaol)	6·40
Do. Stephens	4 60
Strydenburg	3·28
Rietfontein (Gordonia)	2·51

X. SOUTH-EAST:

Melrose (Div. Bedford)	3·59
Dagga Boer	0·94
Fairholt	2 38
Lynedoch	2·17
Bedford (Gaol)	4·04
Do. (Hall)	3 68
Sydney's Hope	2 03
Cullendale	2·20
Adelaide	2,59
Atherstone	2·72
Alexandria	1·17
Salem	1·03
Fort Fordyce	3·76
Grahamstown (Gaol)	2·95
Heatherton Towers	5 07
Sunnyside	2·92
Fort Beaufort	4·30
Katberg	7·30
Seymour	4·76
Glencairn	5·13
Lovedale	4·61

X. SOUTH-EAST—*continued*	INCHES
Port Alfred	1·84
Hogsback	5 46
Peddie	2·30
Exwell Park	1·89
Keiskamma Hoek	3·20
Cathcart (Gaol)	1·90
Cathcart	1·19
Thaba N'doda	3·74
Evelyn Valley	6 36
Thomas River	1·49
Perie Forest	4·86
Forestbourne	2 89
Isidenge	2·78
Kologha	3·12
King William's Town (Gaol)	2·30
Do. (Dr. Egan)	1·86
Fort Cunynghame	2 72
Kubusie	3 59
Quacu	4·72
Blaney	0·25
Kei Road	3 26
Fort Jackson	0 00
Prospect Farm (Komgha	4 87
Komgha (Gaol)	3·32
Chiselhurst	1·53
East London West	0·86
Cata	5·95
Wolf Ridge	5 97
Dontsah	2 71
Mount Coke	0·70
Blackwoods	6·12
Albert Vale (near Bedford)	4·06
Heatherton Towers (Irrigation)	5·27

XI. NORTH-EAST:	
Venterstad	3·81
Burghersdorp (Gaol)	3·40
Ellesmere	3·06
Molteno	2·83
Lyndene	2·73
Thibet Park	1·77
Sterkstroom (Station)	1·56
Do. (Gaol)	1·57
Rocklands	2·46
Aliwal North (Gaol)	4·08
Do. (Brown)	4·56
Do. (Dist. Engineer)	5·33
Carnarvon Farm	2·15
Halseton	3·11
Jamestown	3·03
Whittlesea	2·85
Queenstown (Gaol)	2·36
Rietfontein (Aliwal North)	3·07
Middlecourt	4·39
Dordrecht	3·90
Tylden	1·86
Herschel	3 93
Lady Grey	4 46
Lauriston	2·98
Lady Frere	4·40
Contest (near Bolotwa)	4·26
Sterkspruit	6·92
Keilands	3·45
Barkly East	5·16
Blikana	5 32

XI. NORTH-EAST:—*continued.*	INCHES
Rhodes	5·12
Albert Junction	3·23
Hughenden	2 76
Glenwallace	3·72
Indwe (District Engineer's Office)	2·61
Bensonvale Inst. (Herschel)	5·40
Cathcart (Station)	0·50
Lady Grey Station	3 84

XII. KAFFRARIA:	
Ida (Xalanga)	6·26
Slaate (Xalanga)	6 55
Cofimvaba	4·30
Tsomo	3·34
N'qamakwe	4·80
Engcobo	4·97
Butterworth	4·10
Kentani	2·44
Maclear	6·50
Idutywa	4·53
Bazeya	7·23
Willowvale	3·78
Mount Fletcher	4·41
Somerville (Tsolo)	5·59
Elliotdale	2·75
M'qanduli	1·06
Umtata	4·87
Cwebe	2·38
Tabankulu	3·39
Mount Ayliff	2·82
Kokstad	3·95
Do. (The Willows)	4·09
Seteba	6·17
Flagstaff	4·01
Insikeni	7·87
Port St. John's	2·51
Umzimkulu	4·96
Wanstead	12·25
Maclear (Station)	7·01
Elliot (Station)	5·18

XIII. BASUTOLAND;	
Mohalies Hoek	5·55
Maseru	5·82
Teyateyaneng (Berea)	3·87
Qacha's Nek	7·20
Leribe	5·59

XV. NATAL:	
Durban (Observatory)	4·06

XVII. BECHUANALAND:	
Taungs	2·64
Vryburg	2·64
Mafeking	4 24
Setlagoli	4·37
Kuruman	2·20

XVIII. RHODESIA:	
Hopefountain	8·51
Inyanga	17·58

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 30th March, 1907, ruling at the several centres named, is published for general information:—

CENTRE.	A. Wheat per 100 lb.	B. Wheat Flour per 100 lb.	C. Boer Meal per 100 lb.	D. Mealies per 100 lb.	E. Mealie Meal per 100 lbs.	F. Barley per 100 lb	G. Oats per 100 lb.	H. Oat-hay per 100 lb.	J Potatoes per 100 lb.	K Tobacco (Boer Roll) per lb.	L. Beef per lb.	M. Mutton per lb.	N. Fresh Butter per lb.	O. Eggs per doz.	P. Cattle (Slaughter)	Q. Sheep (Slaughter)
	£ s d	£ s. d	£ s d	£ s d	£ s. d	s d	s. d.	£ s d	£ s. d.	£ s d.	s. d	s d	£ s. d	s d		
Aliwal North ..	0 9 0	0 12 0	0 10 0	0 8 0	0 4 0	7 6	8 0	0 5 0	0 5 0	1/- to 2/-	0 7	0 7	0 1 3	1 6	£9	17/-
Beaufort West ...	0 10 6	0 15 6	0 12 6	0 9 6	0 12 0	9 0	9 0	0 5 6	0 7 0	0 0 10	*6d to 7d	*6d to 7d	0 1 6	2 0	£10 to £15	20/6
Burghersdorp	...	...	...	...	...	..	...	0 3 0	0 3 0	...	*0 6	*0 5½	0 1 1	1 9	...	...
Cape Town ...	...	...	...	...	...	8 0	7 0	0 4 6	0 6 0	...	...	...	0 1 2	1 9	...	...
Clanwilliam ..	11/3 to 12/-	...	12/6 to 13/-.	0 8 0	...	8 0	7/- to 11/6	0 0 6	0 7 0	0 1 0	7d. to 8d.	7d to 8d	0 1 9	1/- to 1/3	...	...
Colesberg ..	...	...	...	0 12 9	...*	...	...	0 6 6	0 6 0	...	...	0 4	10d to 1/3	1 6	...	...
Cradock ..	0 7 6	...	...	0 6 0	0 6 0	5 0	6 0	0 4 6	0 3 9	0 0 6	...	0 6	0 1 0	2 0	£17	17/-
Dordrecht ..	0 7 0	0 12 6	0 10 0	0 6 0	0 7 0	5 0	5 0	0 2 0	0 2 0	0 1 0	0 8	0 7	0 0 8	1 6	£10	18/-
East London ...	0 11 0	0 11 0	0 11 0	0 5 6	0 9 6	4 6	9 0	0 4 3	0 4 0	0 1 6	*8d & †7d	*8d & †7d	0 2 0	1 9	£22	37/6
Graaff-Reinet ..	0 10 0	...	...	0 7 0	...	5 0	7 0	0 4 0	0 1 3	...	0 6	0 6	0 1 0	1 0	£10	18/6
Graham's Town	0 6 9	...	...	0 7 3	...	4 6	6 6	0 5 2	0 4 3	0 0 6½	0 6½	0 7½	0 1 10½	2 3½	...	...
Kimberley ..	0 10 0	0 14 6	0 12 9	0 5 3	0 7 6	7 6	8 6	0 6 3	0 14 0	0 0 7½	0 10	0 8	0 1 2	1 9	£10 to £12	18/- to 20/-
King Wm's Town	0 6 6	0 7 3	0 12 0	0 5 6	0 7 0	5 6	5 0	0 4 9	0 4 6	0 0 6	0 6	0 7	0 1 9	2 0	...	...
Malmesbury ..	0 9 0	0 14 0	0 10 0	0 17 6	...	7 0	6 0	0 3 7	0 9 0	0 0 10	0 7	...	0 1 7	1 6	£14	£1 4s.
Mossel Bay ...		...	...	...	...	...	...	...	0 15 0	...	...	...		...	...	...
Port Alfred ...	0 8 6	0 16 0	0 14 0	0 6 0	0 12 6	5 0	6 0	0 3 0	0 4 0	0 1 0	0 8	0 8	0 2 6	2 6	...	...
Port Elizabeth ...	0 7 0	...	...	0 7 0	...	4 6	6 6	0 4 6	0 6 6	0 0 4½	0 7	0 7	0 1 2	1 6	...	...
Queen's Town ...	0 5 3	0 9 3	0 5 0	0 4 6	0 4 3	4 3	6 2	0 2 1	0 3 0	0 1 0	*0 6	*0 6	0 1 3	2 0	£12 to £15	20/- to 26/-
Tarkastad ..	0 12 0	0 14 0	0 13 0	0 8 0	0 9 6	6 6	10 0	0 6 0	0 5 0	0 1 0	*0 6	*0 6	0 1 0	1 4	£10	20/-
Vryburg ..	...	...	...	...	...	...	...	...	..	...	...	...	...	...	...	...
Worcester ..	0 8 6	0 13 6	0 10 6	0 7 6	0 8 6	7 6	6 0	0 4 0	0 4 0	0 0 6	*6d to 10d †6d to 9d	*7d & †6d	0 1 6	1 6	£8 to £11	21/- to 26/-

NOTE.—A blank space denotes "no transactions. *Colonial †Imported

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town. Members of Farmers' and Fruit Growers' Associations applying for same through the Secretaries of these Associations are supplied free of charge.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V of *Agricultural Journal.*

Artificial Grasses and Fodder for Stock; Ensilage; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry; Locusts and their Destruction; Possible New Industries for Cape Farmers; Dairying; Fruit Culture (6d.)

Agriculture.

Wheat Production in Australia (1s. 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s. 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A. W. Heywood; *Brak Land in Relation to Irrigation and Drainage (1d.); The Velvet Bean (1d.); Potato Disease (1d.); Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d); Sundry Forage Crops for trial in Cape Colony (1d); Poultry in South Africa: Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.); Tobacco Culture by P. Boroemisza (1d.); The Cultivation of Tobacco in the Colony by K. Schenck (3d.); Tobacco Wilt in Kat River Valley (1d.); *The Process and Appliances for the Flue Curing of Tobacco. (3d)

Dairying.

Dairy Breeds by A. C. Macdonald (9d); *Dairy Industry in Great Britain by A. C. Macdonald (6d.); *Dairy Industry in Denmark (2d.); Ready Reckoner for Cream Testing (1s.); †Dairy and its products by D. Hutcheon (2d.); *Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.); Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d.); *Codling Moth (1d.); Fruit Fly (1d.); Fumigation Supplies (1d.); Insect Friends and Foes (1d.); Methods of Locust Destruction (1d); *Peach Yellows (1d); Pear Slug, Paris Green (1d.); Remedy for Mestwurmen (1d.) *Spray Calendar (1d.); *Spray Pump Notes (1d.); Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d.); Tree Fumigation in California (1d.); Winter Spraying (1d.); Wattle Bag Worm (1d.); Bordeaux Mixture (1d.); Deaths Head Moth Superstition (1d); Fumigation under Box Covers (1d.); The House Fly (1d.); New Oak Tree Pest (1d.): Nursery Inspection and Quarantine Bill (1d.); Potato Tuber Moth (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d.); Gall Worms in the Roots of Plants (1d.); The Fruit Fly,* (with coloured plates) (3d.); Another Introduced Scale Pest (1d.); Washes for Red Scale (1d.); Fruit Fly: Peach Fly (1d.); Lime-Sulphur-Salt Wash for Scale Insect (1d.); The Fruit Moth (1d.); Fusicladium of the Apple and Pear (1d.); Mealie Stalk Borer (3d.)—*coloured plate*: Cleaning up Nursery (1d.); Natural Enemies of the Fruit Fly: Report on Investigations in Brazil (1d); Locust Birds and Locust Poison (1d.); The Brazil Fruit Fly Parasites (1d.); Cyanide Gas Remedy for Scale Insects (3d.); Arsenate of Lead (1d); The Antestia Fruit Bug (1d.); Caterpillars Destroying Trees (1d.)

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d.); †Elementary Principles of Sylviculture or Woodcraft (1d). National Forests (1d.); Indigenous Timbers of the Cape (1d.); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.); Tree Planting for Farmers (1d)

Note.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d.); Portable Floating Hatching Box for Trout Ova (1d.) The Protection of Trout (1d.); The Ocean and its Resources (1d.)

Horticulture

Fruit Culture in the Gamtoos River Valley (1d.); *Marketing of Fruit (1d.); The Olive at the Cape (2d); Tomatoes and Fruit for Export (1d); Citrus Culture in Cape Colony; Report of the Citrus Commission (1d.); *Fruit from Orchard to Buyer (1d); Netting for Fruit Trees (1d.); Fruit Culture in Argentina (1d.); Vegetables for Exhibition (1d); Chrysanthemum Rust (1d.)

Veterinary and Animal Industry,

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d.); * Heartwater (1d); *Malarial Catarrhal Fever of Sheep (1d.); Rinderpest: Dr. Koch's Report (1d.); *Inoculation against Rinderpest (1d.); Dr. Kohlstocks Report on Inoculation for Rinderpest (1d.); *Redwater, Texas Fever or Tick Disease (1d.); *Redwater, Anthrax and Quarter Evil (1d.); *Sheep and Wool (1d.); The Eye and its Diseases (1d.): Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.); Tick Heartwater Experiments (1d.); Indigestion and Diarrhœa in Calves (1d.); Persian Sheep and Heartwater (1d); Poisoning of Stock (1d.); Retention of the Fœtal Membrane, or Afterbirth in Cows (1d); Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d.); Tuberculosis and the Use of Tuberculin (1d.); African Coast Fever with Description of Dipping Tank (3d.); *Rinderpest in South Africa (3d) by D. Hutcheon; *Fluke or Slak in Liver of Sheep (3d.)—*coloured plate*; *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.); Osteo Porosis (3d.—*coloured plates*; *Glanders (3d.)—*coloured plate*; *Animal Castration (1d.); *Preventive Inoculation for Redwater (1d.); * Abortion in Cattle (1d.); Treatment for Worms in Domestic Animals (1d.); *Lungsickness of Cattle, Contagious Pleuro-Pneumonia, or Pleuro-Pneumonia-Bovum-Contagiosa (1d.); *Swine Fever, Hog Cholera or Pig Typhoid (3d.)—*coloured plates*; Castration of Females and Animals other than the Horse (1d.); Poisoning of Horses by *Ornithogalum Thyrsoides* or Chinkerinchee (*coloured plate*) (3d.); Horse Sickness by D. Hutcheon (2d.); Ticks and Afrian Coast Fever (1d.); Cirrhosis of the Liver in Stock (1d.); Liver Disease among Calves (3d.); The Arsenite of Soda Dipping Mixture (1d.); *Lampas; Preventive Vaccination against Anthrax.

Viticulture.

†Reports on Viticulture (3d.); *Reconstitution of Phylloxerised Vineyards (1s.) Report on Failure of Hanepoot Grapes on American Vines (1d.); The Making of Wine and its By-Products (6d.); How to Treat Wine Casks (1d.); Failure of Vines (1d.); Manufacture of Dry Wines in Hot Countries (3d.); Anthracnose in Constantia (1d.)

Miscellaneous.

Game Seasons (3d.); Land Laws of Cape Colony (1d.): †Monsonia: the Cape Cure for Dysentery (1d.); *Rainfall of South Africa (1d.); Sand Dunes of Gascony (5d.); The Metric System (1d.); South African Stud Book, Constitution, Rules, &c. (1d.); Bars in Ostrich Feathers (1d.); *Information regarding the Mining Laws. (1/-.); The Preservation of Game in Cape Colony.

NOTE.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

R. MÜLLER, 77, STRAND STREET, CAPE TOWN,

Pays HIGHEST prices for:—

WOOL, OSTRICH FEATHERS,

MOHAIR, SKINS, HIDES,

and other PRODUCE.

R. MÜLLER, Cape Town,

Supplies **Best MERINO RAMS** and **EWES.**

Bankers: African Banking Corporation.

P.O. Box No. 133. Telegrams: RELLUM, Cape Town. Telephone No. 180.

R. MÜLLER,

77, Strand Street, CAPE TOWN.

BENNIE & COMPANY,

Produce Merchants,

Forwarding and Commission Agents,

Market Street, Kimberley

CONSIGNMENTS of Produce, Fruit and Live Stock received and sold on the Market, or out of hand, to best advantage, followed by prompt remittance.

FORWARDING to any part of the Country carried out, with all expedition.

PRODUCE of all Kinds bought for Cash, Large Stocks held in our Stores.

BONE MEAL.—We have been appointed *Government Agents for Kimberley District.* Large or small quantities can be supplied to Farmers at cost price.

CORRESPONDENCE INVITED.

Telegrams: BENNIE—KIMBERLEY. *P.O. Box 39.*

THE PRODUCE MARKET.

CAPE TOWN.

Mr. R. Muller, of Strand Street, Cape Town, reports for the month ending March 31st:—

Ostrich Feathers.—There is a strong enquiry for all good quality Wings, Spadonas and Tails, while common quality is rather easier. The market has been well supplied with the usual average assortment; in the case of good pluckings there is no difficulty in selling.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Primes	11	0	0	35	0	0	Floss	0	5	0	1	10	0
Firsts, Ordinary to Super	8	10	0	12	10	0	Long Drabs..	2	10	0	4	0	0
Seconds	6	10	0	8	10	0	Medium Drabs	1	5	0	2	0	0
Thirds	3	10	0	5	10	0	Short to Medium ..	0	10	0	1	15	0
Femina, Super	9	10	0	14	0	0	Floss	0	2	6	1	10	0
Femina, Seconds to Firsts	4	10	0	8	10	0	White Tails..	1	15	0	3	10	0
Byocks (fancy).. ..	5	10	0	8	10	0	Coloured Tails	0	10	0	2	10	0
Long Blacks..	3	10	0	7	10	0	Chicks	0	1	0	0	2	0
Medium Blacks.. ..	2	0	0	3	0	0	Spadonas..	2	10	0	4	10	0
Short to Medium ..	0	10	0	2	10	0	Inferior Black and Drabs, short to long..	0	0	6	1	10	0

Wool.—The London wool sales opened on the 12th March with active competition; the attendance was large, and, compared with last sales, prices ranged from par to 5 per cent. higher. There has been a strong demand in our market during the past month, particularly for all good combing wools and for light lambs'. Short and musty lots continue to be neglected. Good Karoo clips realised from 7d. to 8d., while super lots reached 8½d. A lot of super light Roggeveld fetched the very high price of 9⅝d. per lb. Snow-whites are in strong demand; extra super Paarl may be quoted up to 1s. 10½d.; Malmesbury wools are dragging, many lots being earthy and burry, prices vary from 5½d. to 6¾d.

	s.	d.	s.	d.		s.	d.	s.	d.
Super long Grass Veld	0	8	0	10	Snow-white, Super to Extra	1	7	1	10½
Do. Karoo	0	6¾	0	8	Do. Ordinary	1	1	1	6½
Medium..	0	5	0	6	Fleece, washed	0	0	0	10
Short and Inferior ..	0	4	0	4½					
Wool for washing	0	4½	0	6					

Mohair.—The market is without change. The offerings consist mostly of mixed lots, which are sold at old rates. There is a good enquiry in the Home markets, the average consumption being kept up by a steady demand. Super Firsts may be quoted from 14d. to 14½d.; Super Kids from 17d. to 18d.; Winter Hair from 11d. to 11½d.; Winter Kids, 13d. to 14½d.

	s.	d.	s.	d.		s.	d.	s.	d.
Firsts, Summer	1	1½	1	2½	Winter	0	10½	0	11½
Kids	1	4	1	8	Do. Kids	1	1	1	2½
Seconds	0	6½	0	10					

Hides and Skins.—The market is firm; all classes meet with strong enquiry. Long Wool Skins advanced ¼d. on the London sales; other classes remained unchanged. Goat Skins are firm, light realising up 13¾d.; heavies up to 12d.

PORT ELIZABETH.

Messrs. J. Daverin and Co., report under date March 28 :—

Ostrich Feathers.—Only two days' market was held this week, when a fair average assortment was offered. The quieter tone which was evident at the close of last week's sale was continued, and prices were somewhat easier all round, except perhaps in the case of some lines of superior Whites and Feminas; and also Spadonas, which latter description continues in strong demand at full prices. The total quantity sold realized £8,146 1s. 5d., and weighed 2,481 lbs. 1¾ ozs. Only a very limited business was done out of hand during the week, buyers' offers being decidedly lower than prices obtained recently. The prospects for the immediate future of the feather market are considered as somewhat uncertain. It is generally expected that the London sales opening on the 8th prox. will rule firm, but some advance on wing goods will have to take place in rder to warrant the high prices paid here recently.

	£	s.	d.	£	s.	d.
Primes : Extra super				Special Prices.		
Good to super	12	10	0	16	0	0
Whites : Firsts	9	0	0	12	0	0
Seconds ..	6	10	0	9	10	0
Thirds ..	3	0	0	5	0	0
Feminas :						
Super ..	10	0	0	15	0	0
Firsts ..	7	10	0	10	0	0
Seconds ..	5	0	0	7	10	0
Thirds ..	2	10	0	3	0	0
Greys ..	4	10	0	7	0	0
Fancy ..	5	10	0	8	10	0
Tails ' White ..	1	10	0	3	10	0
Light ..	1	5	0	2	10	0
Coloured & Dark	0	5	0	1	2	6

	£	s.	d.	£	s	d.
Blacks : Long..	3	0	0	6	0	0
Medium ..	1	5	0	2	10	0
Short ..	0	10	0	1	0	0
Wirey ..	0	1	0	0	1	0
Floss ..	0	6	0	1	7	6
Drabs : Long ..	1	10	0	3	5	0
Medium ..	0	12	6	1	0	0
Short ..	0	2	6	0	6	0
Wirey ..	0	0	6	0	1	0
Floss ..	0	6	0	1	7	6
Spadonas :						
Light ..	2	0	0	5	0	0
Dark ..	0	10	0	2	10	0
Chicks ..	0	0	3	0	1	6

Wool.—We have no change to report in this market, which continues steady. The amount of business transacted in the open market during the week has only been limited, as stocks are low, and consist chiefly of heavy and wasty lots, which are not attractive to buyers. The new season's short Wools are coming in slowly, and any light-conditioned lots find a ready sale at full prices. A large proportion of these new Wools, unfortunately, are found to be infested with seed, which of course detracts considerably from their value. Some business has been done in Snowwhites at the prices quoted below. Owing to the Easter Holidays, and the Agricultural Show, it is likely that business will be small during the next two weeks.

Snowwhite Extra Superior ..	20d	21½d
Snowwhite Superior ..	18d	20d
Do Good to Superior	16½d	17½d
Do Inferior Faulty	16d	16½d
Grease, Super Long, well-conditioned, Grassveld grown (special clips)	9½d	10d
Grease, Super Long, well-conditioned, Grassveld grown ..	8d	9d
Grease, Super Long, well-conditioned, Karoo grown (special clips)	7½d	8d
Grease, Super Long, Karoo grown ..	6½d	7d
Grease, Super Long, Mixed Veld ..	5¾d	7d
Grease, Light, faultless, medium, Grassveld grown.. ..	6½d	7¾d
Grease, Light, faultless, medium Karoo grown	6d	6¼d
Grease, Light, faultless, short Karoo grown	5½d	5¾d

Grease, Short, faulty and wasty ..	5d	5¼d
Grease, Coarse and Coloured ..	4¼d	4¾d
Scoured, Coarse and Coloured ..	6½d	12d
Basuto Grease, short..	6¼d	6⅜d
O. R. C. Grassveld Grease, long and well-conditioned (special clips) ..	7½d	8d
O. R. C. Grassveld Grease, long and well-conditioned ..	6½d	7¼d
O.R.C. medium grown, light, with little fault	6d	6½d
O.R.C. short, faulty and wasty ..	5d	5¼d
O.R.C. Karoo grown, long and well-conditioned ..	6¼d	6¾d
O.R.C. medium grown, light, with little fault	5d	6d
O.R.C. short, faulty and wasty ..	4½d	5d

Mohair.—This market is also without any new feature since our last report. A limited business has been done during the week in Super Firsts of last season's growth at 14½d. For other descriptions there is little enquiry at the moment, but it is generally considered that present quotations may be regarded as safe for the near future. On the Public Market on Tuesday, a fair quantity was offered, principally consisting of oddments of mixed Winter and O.R.C. Hair, which for the most part found purchasers at current prices. As shearing the Summer Clip will shortly be commencing, we would take this opportunity of urging upon farmers the necessity of sorting the seedy hair out and keeping it strictly apart from the rest of their clip. Any stained fleeces should also be kept out and baled separately, otherwise the value of the whole clip will be affected.

Super Kids ..	1s	6d	1s	6d
Ordinary Kids ..	1s	4d	1s	5d
Superior Firsts, special clips	1s	2½d	1s	2½d
Ordinary Firsts ..	1s	2d	1s	2d
Short Firsts ..	1s	1d	1s	1½d
Superfine Long Blue, O.R.C. Hair nominal	1s	2d	1s	2½d
Mixed O.R.C. Hair (average) ..	0s	11d	0s	11½d

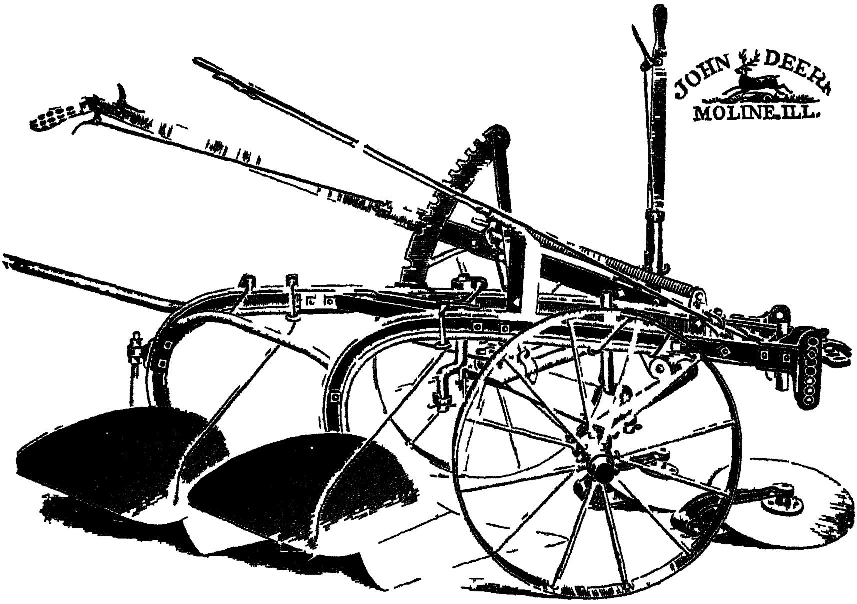
Do. Very Mixed ..	0s	10d	0s	10½d
Seconds and Grey ..	0s	8d	0s	9d
Thirds . ..	0s	6¾d	0s	6¾d
Winter Kids (special clips) ..			1s	2½d
Winter Kids (good ordinary) ..	1s	1d	1s	2d
Winter Hair ..	0s	11d	0s	11½d

Skins. - Sheepskins sold this week in bundles, at 7¼d. per lb.; Pelts at 6¼d.; Capes, 2/2 each, damaged 7d. each; Goat, 14¼d.; damaged, 6½d. per lb.; Angoras, 9¼d. per lb.; Shorn, 6½d.; damaged, 4¼d. per lb.

Hides.—Sundried sold at 9¼d., damaged, 6¼d. per lb.: Drysalted, 8d.; damaged, 5½d. per lb.; Madagascar hides, 7d.; damaged, 5½d. per lb.; Thirds, 3½d.

1st PRIZE

WAS AWARDED TO THE



DEERE TWO FURROW GANG PLOW

BY THE

PORT ELIZABETH AGRICULTURAL SOCIETY, 1906,

Beating TWENTY NINE Gangs of other makes.

ASK YOUR LOCAL DEALER FOR IT, or write for Catalogue and Prices of the FAMOUS—

DEERE LINE of Agricultural Implements

We have a Complete Stock to select
from, and keep all Spare Parts.

Address:

MORRIS & MOWLEM, King William's Town.

MORRIS & MORRIS, Queenstown.

C. J. STIRK & SON, Grahamstown.

J. Z. HENNE (Rep. DEERE & CO., and DEERE & MANSUR CO.),
Box 57, King William's Town.

BREEDERS' DIRECTORY

AND GENERAL FARM NOTICES.

Notices under this heading are inserted at the rate of one penny per word per issue; minimum charge 2s. 6d Payment must accompany order. Six consecutive insertions 10% discount; twelve 15% discount Cheques and P.O.O. to be made payable to the Accounting Officer, Department of Agriculture, Cape Town

CATTLE.

HEREFORDS.

Young bulls for sale, sired by "Chain Armour" ("Armour Plate," 19838,—"Patience"). First prize winner Port Elizabeth and East London Shows, 1905-1906. Mr. B. Webb, Arundel Stud Farm.

JERSEYS.

Thoroughbred Herd. Celebrated Island bred bull "Clove," and several of the best cows and heifers from Mr. H. W. Struben's late herd.—Mrs. A. A. Dunn, De Tuin, Piquetberg.

Thoroughbred pedigree bulls for sale, from Imported or Colonial bred prize stock, good milking strain. For particulars, apply to Superintendent, Porter Reformatory, Tokai, P.O. Retreat.

FRIESLANDS.

Pure Frieslands. Enquire for cows, young bulls, and heifers. Oldest pure herd in Eastern Province. Grand milkers. Prize stock. Also, Colonial Rambouillet Flock Rams, limited number.—F. F. Wienand, Bellevue, Bedford, C.C.

R. Cross, Hillside, P.O. Bolotwa. Has high-class Friesland bulls for sale. Herd may be seen by appointment. Bulls from Imported and Colonial Cows.

SHEEP.

MERINOES.

Rambouillet Rams, from Colonial Ewes by Imported and Colonial sires. Sold at all Bedford Ram Fairs. Partridge Wyandottes and Indian Runner Ducks' Eggs.—Pringle Bros., Glen Thorn, P.O. Linton, Adelaide.

R. Pell Edmonds, Ripplemead, Dohne, Breeder of Pure-bred Pedigree Merino Sheep and Pedigree Black Welsh Cattle. - For particulars, see page xxxviii.

PIGS.

Arthur Jones, Green Bushes, Port Elizabeth Breeder of Berkshire and Large White Yorkshire Pigs from Imported Pedigree strains; Winners of 14 First, 6 Second Prizes and 1 H. C. at Grahamstown and Port Elizabeth Shows of 1905 and 1906.

Berkshire pigs, thorough bred, pedigree, boars and sows, from Imported stock, winners of numerous prizes. For particulars, apply to, Superintendent, Porter Reformatory, Tokai, P O Retreat.

OSTRICHES.

Specials only.—Chicks, £5 to £20 each; Young Birds, £10 to £30—F W. Baker Laughing Waters, Willowmore.

GENERAL.

H. Vermaak, The Pines, Maraisburg, Cape Colony, has on hand and for sale at very reasonable prices, PURE-BRED FRIESLAND BULLS and PURE-BRED MERINO RAMS of the RAMBOUILLET breed.

THOROUGHBRED PERSIAN RAMS and OSTRICHES.—Hougham Abrahamson Long Hope Siding, C.C. Breeder of Rams from progeny of ewes passed into Stud Book. of Cape Breeders' Association. Also selected Breeding Ostriches.

PASPALUM GRASS PLANTS.—Quotations for plants, in bags free on rail Stellenbosch (keep moist long distance). See *Agricultural Journal,* May, 1906, page 622, or from A. C. Buller, Dwarsriviershoek, Stellenbosch.

PURE BRED ANGORA GOAT RAMS.

Bred from the Choicest Strains, and Prize-winners at the leading Agricultural Shows of Cape Colony. For particulars apply to A. B. Hobson, Martyrsford, Jansenville.

PERSIAN SHEEP AND OSTRICHES.

S. Montague Gadd, Springfield, Tafelberg. Orders booked for young rams, from Stud-book Ewes and for Ostrich Chicks from the best strains in the country.

THE POULTRY YARD.

PRIZE and UTILITY POULTRY of the BEST ENGLISH and AMERICAN STRAINS.—SOUTH AFRICAN BRED. —Hardy, Healthy, Vigorous, Egg Production a Speciality. WHITE LEGHORNS—BROWN LEGHORNS —BUFF LEGHORNS - WHITE WYANDOTTES — SILVER PENCILLED WYANDOTTES—BARRED PLYMOUTH ROCKS Stock & Eggs for Sale in Season.—Correspondence invited.—S. Smith, Talana, Wellington Avenue, Wynberg.

Geo. E. Barrett, P.O. Box 964, Cape Town. Importer of Poultry, Pigeons, Cage Birds and Appliances of every description, from Wicks Bos., Norwich. Trial solicited and Catalogues forwarded on application.

Elsenburg Agricultural College, Mulder's Vlei. A few pure bred Barred and White Plymouth Rocks and Silver Wyandottes for sale. Price 7 6 each, f.o.r., Mulder's Vlei. Eggs from these breeds and Black Minorcas next month, 8/6 per setting of 15. Terms, cash with order.

BUFF ORPINGTONS.

THE FARMER'S FOWL. The fowl that LAYS WHEN EGGS ARE TOP PRICE and are also A 1 table birds. My Buffs have unlimited orchard and grass run, and are noted for hardiness and good laying qualities Young stock always for sale at very reasonable prices. Ask for inclusive quotations; carriage paid to any station in South Africa and AT MY RISK to rail destination. My list of prizes won at shows all over South Africa will convince you that this unrivalled *Colonial* strain of 9 years' standing CAN HOLD ITS OWN AGAINST IMPORTED STOCK. Buy hardy Colonial-bred birds and save your pocket. Eggs from pure-bred utility strain, 12/6. Address: A. C. Buller, Dwarsriviershoek, Stellenbosch.

TURKEYS.

MAMMOTH AMERICAN BRONZE. HARDY STRAIN OF GREAT SIZE. Noted prize winners. Young stock for sale after April. Orders booked now. Ask for inclusive quotations. Carriage paid to any station in South Africa and AT MY RISK to rail destination. Eggs in season. Full particulars from A. C. Buller, Dwarsriviershoek, Stellen bosch.

THE

Agricultural Journal

OF THE CAPE OF GOOD HOPE.

No. 5. MAY, 1907. VOL. XXX.

Published Monthly in English and Dutch by the Department of Agriculture and distributed gratis to bona fide farmers in the Cape Colony on application through the Resident Magistrate of the District.

Advertising.—Approved Advertisements are inserted. Full particulars can be obtained of Messrs. Hart & Co., the Advertising Agents, Parker's Buildings, Cape Town (P.O. Box 898), to whom all communications *re* advertising should be addressed. Telegrams: "Advertise," Cape Town.

Postal Address:

The Editor "Agricultural Journal," Department of Agriculture, Capetown

Telegraphic Address: "Bulletin," Capetown.

CONTENTS.

PAGE.

NOTES— 590—597

Ramie for South Africa.—Rietti Wheat.—Tagasaste, Tree Lucerne.—Lucerne Cultivators.—£100 for a Cultivator—Wire Worms in Sheep.—The Stellenbosch Winery.—Jackal-Proof Fencing.—Cattle Dipping in Arsenite of Soda.—A Rhodesian Farmers Handbook.

FARM AND VELD— 598—604

Wooly Aphis and Root Rot.—Scrub Exterminators.—Corn Crickets: Remedial Measures—Farmers' Wool Presses.—Malkop or Gid: Sturdy: Turnsick in Sheep and Goats.—Lungsickness and its Prevention.

A TREATISE ON CITRUS CULTURE FROM SEED TO FRUIT. By W. E. Masters ... 605—630

THE FARMERS' CONGRESS (*Concluded*) ... 631—667

EXPERIMENTS WITH OSTRICHES ... 668—670

SOME RECENT IMPORTATIONS OF FRIESLAND CATTLE. By Dr. Eric E. Nobbs ... 671—676

BOTS OR "PAAPJES." By D. Hutcheon, Director of Agriculture ... 676—683

THE WOOL TRADE OF THE CAPE ... 684—690

TOBACCO WILT IN THE KAT RIVER VALLEY ... 691—693

THE AGRICULTURAL SHOW SEASON ... 694—695

MANURING OF OATHAY AT ELSENBERG COLLEGE ... 698—702

CORRESPONDENCE 703—714

The Divining Rod: Is it a Fraud?—The Methods of Milking—Preparing Skins for Market—Scab: Its Cause, Nature and Treatment—Inefficacy of Dr. Behring's Serum on Bovine Tuberculosis—Agricultural Shows and Judges—The Poultry Sections of Agricultural Shows—Bare Fallows—Poultry Farming and Fowl Sickness—Pampas Grass to Prevent Sluits—Horse Sickness—Water Drills and Water Boring ...

RETURN OF FRUIT SHIPPED FROM CAPE COLONY TO ENGLAND DURING MARCH, 1907 ... 715

RURAL REPORTS ... 716—717

NOTES ON THE WEATHER OF MARCH, 1907 ... 718—721

RAINFALL RETURNS, MARCH, 1907 ... 723—725

CURRENT MARKET RATES ... 726

DEPARTMENTAL PUBLICATIONS ... 727—728

THE PRODUCE MARKET ... 729—732

BREEDERS' DIRECTORY ... 733—734

INDEX TO ADVERTISERS ... lxxi—lxxii

NOTES.

Ramie for South Africa.

A correspondent writes:—"I have been making enquiries as to the possibility of producing Ramie fibre in this Colony, and have been in communication with the Secretary of the Ramie Growers' Association in England, from whom I have received some seeds and instructions for growing the plant. From the literature he sent me there would appear to be little difficulty in growing the plant, but the information as to the extraction of the fibre and its preparation for market is extremely meagre and indefinite."

The propaganda our correspondent mentions has been going on for years, but, as he points out, the real test is that of manufacture. As a matter of fact, Ramie will grow, practically speaking, anywhere, but until machinery for the decortication of the fibre is available it can never prove profitable in a country like this. In China, India, or Egypt, with an abundance of cheap labour, the industry thrives.

Rietti Wheat.

Messrs. Coaton and Louw, of Wellington, write under date April 17th:—Our attention has been drawn to a very excellent article on wheat appearing in the April number of the *Agricultural Journal*. We note, on referring to the various classes of wheat which answer best in the different localities, among these is Rietti. In the latter end of this article various wheats are mentioned which give the best results, giving the addresses where they are obtainable. On referring to our advertisement, which appears in your *Journal*, you will see that we advertise Rietti Seed Wheat. This we imported direct from the house of Prince Potenzienza, who owns the largest and best portion of the Rietti Valley, and also has a large establishment for the selection and sterilisation of the seed. We were informed that this firm is the only one recommended by the Italian Government, and each bag of seed bears their guarantee. We supplied various farmers in our district last season with very excellent results. We tested the germination, which was 99 per cent., and the result, with broadcast sewing, was 30 to 1 return. We have only a small quantity of this seed left, and should you have any enquiries, we shall be very pleased to supply, and at the same time would esteem it a favour if you would draw attention to this in your next *Journal*. Under separate cover, we are forwarding you a sample for your inspection.

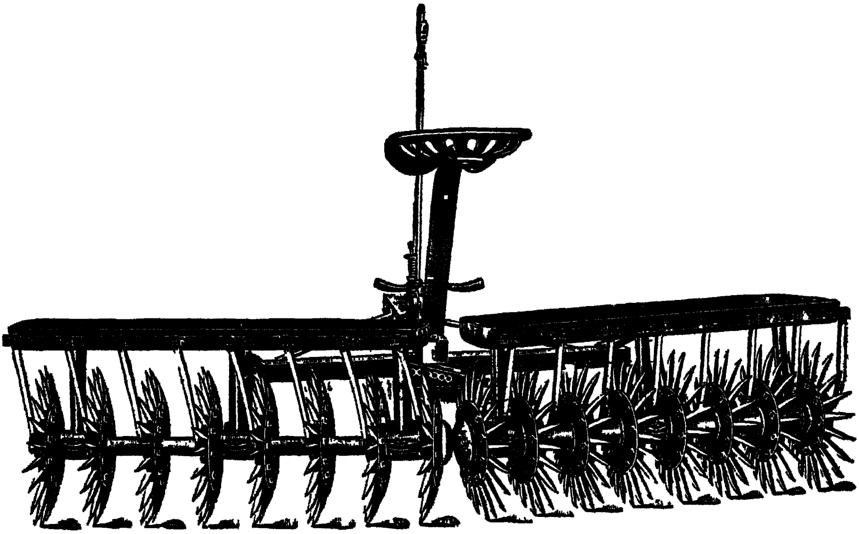
The Prince Potenzienza referred to by Messrs. Coaton and Louw is the head of the Co-operative Society of Farmers who grow Rietti wheat alluded to in the article. Hence this seed is identical, and is the only genuine Rietti seed obtainable.—E. A. N.

Tagasaste, Tree Lucerne.

From time to time enquiries are made of the Department as to the properties and value of Tagasaste or Tree Lucerne (*Cytisus proliferus*). This is neither a tree nor is it lucerne, but a bush rising to a height of twenty to thirty feet, with a three-lobed leaf not unlike that of our great forage plant. Tagasaste is a native of the Canary Islands, and has been successfully introduced to Teneriffe, where it is highly spoken of by Dr. Perez, of Puerta Orotave, who recommended it for Cape Colony. It was first tried here in 1880, but without much success. In 1885 it was tried by the Forest Department, and now specimens may be found in such various places at Tokai and the Peak Plantations, Cape; at Darling; in the Pirie Mountains; at Burghersdorp; at Atherstone, Albany; on the Zuurberg, and in Griqualand East. Nowhere has it proved a conspicuous success, nor has it realised the great expectations that were at one time conjured up of its epoch-making value. If left to grow, it forms a high hedge useful for shelter, and furnishing fodder from the prunings. At Teneriffe it is planted out from seed-beds to three feet by three feet, and commences, after three years, to yield a fair amount of fodder, said to be much relished by all stock, and not allowed to grow much over three feet each time. As there is often difficulty in inducing the seed to germinate, it should be well scalded with boiling water before sowing. It seems to do well on poor soils, but not to stand severe frost or extreme drought or wetness. With the above information before us, Tagasaste can only be recommended for cautious trial by those interested, and anyone possessing experience of its growth in the Colony is requested to communicate with the Agricultural Assistant on the subject. Seed may be had from the Forest Department, Cape Town, at a charge of 1s. per lb.—E. A. N.

Lucerne Cultivators.

One of the problems which face the grower of Lucerne in this country, and probably the most important, is that of cultivation. Wherever this valuable crop is laid down one hears the same question being discussed—which is the best and the most suitable implement for cultivation. Several attempts have been made to devise an implement for that special purpose and success is claimed for many of them, but the trouble seems to be always with us all the same. The disc, the spring tine, the spring tooth in harrows and cultivators, are each and all in evidence with special features to meet one or other of the particular needs and these are in general use. Other types have been put forward which, like the Cawood and the Moline, embody the principle of the revolving spike digger. These also have their advocates, yet the more experienced growers still maintain that the ideal cultivator for lucerne has yet to be invented. With the object of bringing this question to a head the Cradock people, headed by Mr. Herbert Collett, of Fish River, put up a competition last month offering a substantial prize. The competition took place on Mr. Collett's farm, and the conditions seem to have been favourable to the test. The result was that a machine new to most of the farmers in this Colony and known as the Sandow Cultivator was awarded the prize. We are enabled by the courtesy of Messrs. R. M. Ross & Co., the Cape Town agents for this implement, to reproduce an illustration herewith which shows clearly its mechanical principles.



This spiked disc is undoubtedly very near perfection for the eradication of weeds, and for the general cultivation of the soil, but whether it would be successful in keeping down "quick" or running grass, such as predominates in most of the Lucerne sections of this Colony, seems open to question. In any case it is a step in the right direction, for it destroys weeds, splits up the lucerne stools and thoroughly loosens the soil for a depth of from three to six inches. The result of this can be only beneficial, and the implement fully deserves a trial.

£100 for a Cultivator.

The Midland Lucerne Growers however, are not yet satisfied. As a result of this trial at Cradock a movement has now been inaugurated to offer a prize of £100 for the best cultivator suitable for Lucerne sown broadcast. It is probable that the trials will take place next year in March. We have not yet seen the conditions but these will doubtless be soon published, for it will be necessary to make this competition most widely known in order to secure the most satisfactory results. It is a prize worth competing for, as it will allow of the individual genius as well as the implement maker stepping into the arena, and, we understand, it is the intention of those interested to make it known as widely as possible. The competition is to be conducted under the auspices of the Cradock Agricultural Society, which is among the very first in this country to recognise the necessity of testing implements in field conditions instead of awarding prizes on appearances.

The importance of cultivation for Lucerne has not yet been sufficiently realised in South Africa. The best results can only be obtained by loosening and aerating the soil after every heavy watering, and at the same time by making a fine tilth or mulch on the surface an enormous saving in water is effected, for the mulch checks the capillary action of the sun and thus prevents evaporation. These points have been overlooked in the past though they are being gradually recognised now. To bring about a satisfactory state of things it will be necessary to go in more and more for cultivation, and if this offer results in the introduction of satisfactory implements the money will be well spent. The Cradock Society in undertaking this pioneer work is deserving of the fullest support, and it is hoped that most lucerne growers will contribute. Further particulars can be obtained of Mr. Charles E. Lawford, who is acting as special secretary and treasurer of the work, by addressing him at Mortimer, District Cradock.

Wire Worm in Sheep.

Mr. M. Versfield, of Slangkop, Darling, addressed the following letter to Mr. D. Hutcheon, M.R.C.V.S., Director of Agriculture:—For three or four years now my lambs had been dying of wireworm, and I had tried all kinds of remedies without success. When in 1905, in the *Agricultural Journal* for November, I saw your article on "Treatment for Worms in Domestic Animals," I at once dosed my lambs according to your directions, but found that I lost a good many by the dose (sixty bottles to 1 lb. vitriol—sulphate of copper or bluestone), owing, I suppose, to the unequal strength of the copper sulphate. Last year I tried dosing them differently, and would like to tell you my experience, and if you think it worth while, you can insert it in the *Agricultural Journal* for the benefit of other farmers. In September, 1906, I saw signs of tape worm in my lambs, and took 1 lb. of vitriol to 100 bottles of water, and gave each lamb two ounces in the morning, kept them in kraal the whole day, and gave two ounces again in the evening. I did not lose a single lamb, and they absolutely got rid of all the tape worm. In October, 1906, I dosed them in the same way for wireworm, but took only eighty bottles of water to the 1 lb. of vitriol. In November I repeated the dose. Up to the present date I have not lost any lambs, nor do they shew any signs of wireworm. They are fat and healthy, and never shewed any ill effects of the dosing. I cannot omit rendering you my sincere thanks for the help your article in the *Journal* has been to me.

The Stellenbosch Winery.

In the article on the Stellenbosch Winery in the last issue of the *Agricultural Journal*, it was inadvertently stated that the buildings were designed by Mr. Dubois, and to him was due the idea of the open fermenting house above the cellar. The credit for the whole of this work is really due to Mr. Chandler, Engineering Lecturer and Instructor at Elsenberg Agricultural College. The open shed above was entirely his own idea, and was adopted on being approved by Mr. T. Micklem. The building is of steel and armoured concrete throughout.

Jackal-Proof Fencing.

Among the many features of the last Port Elizabeth Show was a competition for the best machine for constructing jackal-proof fencing. This prize fell to Mr. L. J. Roberts, of tubular gate fame, his barbed wire lacing machine seeming to have solved the problem. The machine is very simple, and the method of constructing a fence with it is as follows: A barbed or plain wire fence is put up of any desired number of strands in the ordinary way. The ordinary double lace of No. 12 wire is then put on by the machine at any desired distance, this being done by two turns of the handle, and it is done so speedily that although the laces are placed close together a piece of fence is very quickly finished. We were assured that 80 to 100 laces per hour were put on by the native boys who were operating the machine at the Show. It is claimed that a 12 or 14 wire barbed fence laced closely with this machine is absolutely jackal proof; that it is much more durable than ordinary wire netting; and, moreover, is cheaper than wire-netting by about £15 per mile.

Ostrich farmers object that barbed fences are dangerous to the birds, but some are overcoming this by using three or four plain strands at the top, and the remainder barbed. Others contend that birds very soon become used to barbed wire and keep clear of it. Of course plain wire may be laced with this machine, and provided a sufficient number of strands are used (fourteen should be sufficient) a proof fence may be made with plain wire. This exhibit attracted a good deal of attention at the Show, and we understand that it was taken up by a large number of farmers at once.

Cattle Dipping in Arsenite of Soda.

Mr. Llewellyn J. Roberts, of Cottesbrook, writes:—Having dipped cattle in this dip perhaps during a longer period than any one else in this Colony, it may interest the farmers in the tick infested areas to know the results. Before I started the systematic use of arsenite of soda, in the strength of 5 lbs. to 100 gallons of water, 21 months ago, this farm was infested with ticks of all descriptions. The Bont tick (*Amblyomma hebræum*) and the Blue tick (*Rhipicephalus decoloratus*) were the most abundant; indeed the latter were so numerous that cattle were actually dying from the irritation caused by their numerous bites. Cattle that died from this cause had a jelly like substance under the skin (probably serous fluid congealed) and the skin was highly inflamed. From one calf Mr. Story, who was then conducting experiments for the Government, cut a piece of skin 4 inches square, and counted 1,700 ticks on this piece. Several of my heifers came in with their first calf without a single living teat whereon to suckle it, this being due to the septic bite of the Bont tick. For years I had only been able to rear about 20 per cent. of my calves owing to liver and other diseases.

Before the advent of the bont tick this farm was carrying its thousands of sheep, which I had to sell out on account of Heartwater when the ticks arrived. Sheep farming was therefore impracticable, and cattle farming was also doomed, had not dipping come to the rescue.

With the exception of two months last winter, cattle dipping has been done every fortnight since August 1905 (21 months). The result to day is, that the Blue tick is stamped out entirely, and the Bont tick nearly so, indeed one has to hunt to see one on my cattle. I have reared about 95 per cent. of my calves this season and the cattle on the farm look sleek and fat shewing no ill effect from the continued dipping in arsenic. It is a pleasure to see the heifers and cows come into the kraal with all four teats intact as of old.

When dipping was first started here some of the cows scalded a little, though never badly, but now they are never troubled in that way. Only one calf has died to my knowledge through the direct effects of the dip. There is no doubt, however, that working oxen do suffer if worked shortly after dipping, especially well bred ones, when the weather is hot. They blow a great deal and if not outspanned soon lie down to die. I do not wish it to be understood that I recommend arsenic as a safe dip. I simply give my experience, which amounts to the dipping of about 12,000 cattle in arsenite of soda with the loss of one calf, directly, and two oxen indirectly by working them in the hot sun too soon after dipping.

Mr. Kent, of Grasslands near Fort Brown, tells me he has used the dip in the proportion of 6 lbs. to the hundred gallons for several months without ill effects, except that his calves are inclined to purge after dipping. I know losses have occasionally occurred at other tanks, notably at the Alice public tank, but it is questionable whether in these cases there was not some mistake in the mixing. I would advise anyone starting to use Arsenite to use it at a weak strength for the first once or twice, and to gradually increase the strength. Then also to be quite certain that the exact capacity of the tank is known, so that if rain happens to get into the tank the amount so added will be known, or if evaporation takes place that amount is also known and allowed for

---

In combating the tick plague we have been wonderfully fortunate, first in having an expert like Mr. Lounsbury to work out the life history of the tick and tell us what diseases it causes. Next in the Veterinary Department discovering so cheap and effective a dip as Arsenite of Soda (it costs about 1s. to dip 100 head of cattle). Thirdly in cattle taking so readily to the dipping and being so little affected by it. (I find it as easy to dip a mob of cattle as to drive them into a kraal). And fourthly that cattle are the principal hosts of the tick. Had sheep been the principal hosts, we would have had a much more difficult task, for they cannot be dipped so often in arsenic as cattle, and are a great nuisance to dip. I would rather dip 1,000 cattle than 500 sheep.

Legislation.—Seeing that dipping is now beyond the experimental stage, it is time to consider whether some protection cannot be given to the man who cleans his farm. It is clearly of little benefit to him, if after the expense of clearing his farm of ticks, he should be liable to reinfection by the first lot of cattle driven over his farm by his neighbour. The difficulties in the way of stringent legislation are many, but I think a start might be made in making it illegal for cattle from a tick area to travel over a clean farm, or one on which systematic dipping is being carried out, whether by road or otherwise, unless accompanied by a certificate from the owner of a tank that such cattle had been dipped in some recognised Government dip within 10 days of such passage. Heavy penalties could be inflicted for issuing false certificates or breaking this law.

This appears to me the mildest form of legislation which could be enacted for the protection of the clean farm, and I do not think it would fall more heavily on anyone than the object gained would justify. Thorough spraying might be made an alternative of dipping, and spraying with paraffin would get over the difficulty of working oxen being affected by arsenic. I fear if anything more drastic, such as compulsory dipping in the tick areas were proposed it may make more enemies to the cause than friends.

A Rhodesian Farmers' Handbook.

We have received a copy of *The Farmers' Handbook* issued by the Rhodesian Agricultural Union. It is in reality a report of the proceedings of the Third Annual Congress of Farmers held under the auspices of the Union at Gwelo, in June last. It can, however, be honestly accepted as a handbook to local agricultural affairs as well, for it contains most interesting papers and discussions on most, if not all, of the practical and economic factors connected with the farming industries of Rhodesia. In fact, the Congress seems to have been conducted on such excellent lines that the farming and agricultural bodies of the rest of South Africa might well follow this excellent example. Instead of bald resolutions we have informative papers, and in place of the minor localisms, the larger questions, both cultural and industrial, seem to have been fully and freely debated. Another feature is the important part assigned to the technical officers of the Agricultural Department and the free, intelligent, criticism they were called upon to meet. The book in itself is valuable but the Congress must have stood on an even higher plane. Copies can be obtained of Mr. P. S. Warner, Secretary of the Rhodesian Agricultural Union, P.O. Box 265, Salisbury, Rhodesia, and the published price is 5s. It is well illustrated and can be recommended to anyone contemplating settling in that territory.

FARM AND VELD.

Woolly Aphis and Root Rot.

"Rokeby" writes from Blaauwkrantz, near Grahamstown:—"I have an apple orchard planted on bush ground, some trees of which are ten years old; others are about five years. After planting the younger trees I noticed three with Woolly Aphis blight. I carefully destroyed these trees, roots and all, after which, from time to time, I found others with the same blight, which were also destroyed. But the older trees were never infested, until quite recently I found one to be quite badly taken with it. Several of my trees have also died with *root-rot*. Is there any means of getting rid of the Woolly Aphis, considering it is underground, as well as above? And what causes the Root-rot? If I should plant again I would like to plant trees on blight-proof stocks only. Which would you recommend? Are trees on blight-proof stocks blight-proof themselves, or only the stocks? The trees I have planted give great trouble by sending up numerous shoots from the stump and roots. Is there a stock that will not do this?"

The best thing to be done when Woolly Aphis gets a good hold of an orchard is to uproot the old trees, and re-plant on blight-proof stocks. By blight-proof stocks are, of course, meant those of the "Northern Spy." Mr. Pillans, Horticultural Assistant, states that the stocks should not send up suckers if properly grafted. Trees worked on these stocks are obtainable from the leading nurserymen. The stock is the only part that is resistant to the attacks of the blight, the upper part of the tree must be kept clean by remedial measures. If "Rokeby" is unwilling to re-plant his orchard, he can try the effect of opening up the roots and sprinkling them with tobacco dust. Above ground the tree should be sprayed thoroughly and vigorously with Resin Wash or the clumps of Aphis can be brushed out with paraffin oil.—R. W. Jack, Assistant Entomologist.

Scrub Exterminator.

"Rokeby" also asks:—"In what proportion do you mix the above for use on prickly pear or any other vegetation you wish to kill? Do you have to cut the pear down before using? Is a spray the best thing to use?

Dr. Nobbs, Agricultural Assistant, states that scrub exterminator should be used at the strength of one pound to nine gallons of water. The arsenite does not dissolve readily in cold water, and the best plan is to dissolve the required quantity in a little hot water beforehand, and add the requisite amount to bring it to the right strength. It is the best way to destroy prickly pear. The plants do not need to be cut down before applying the poison.

Corn Crickets—Remedial Measures.

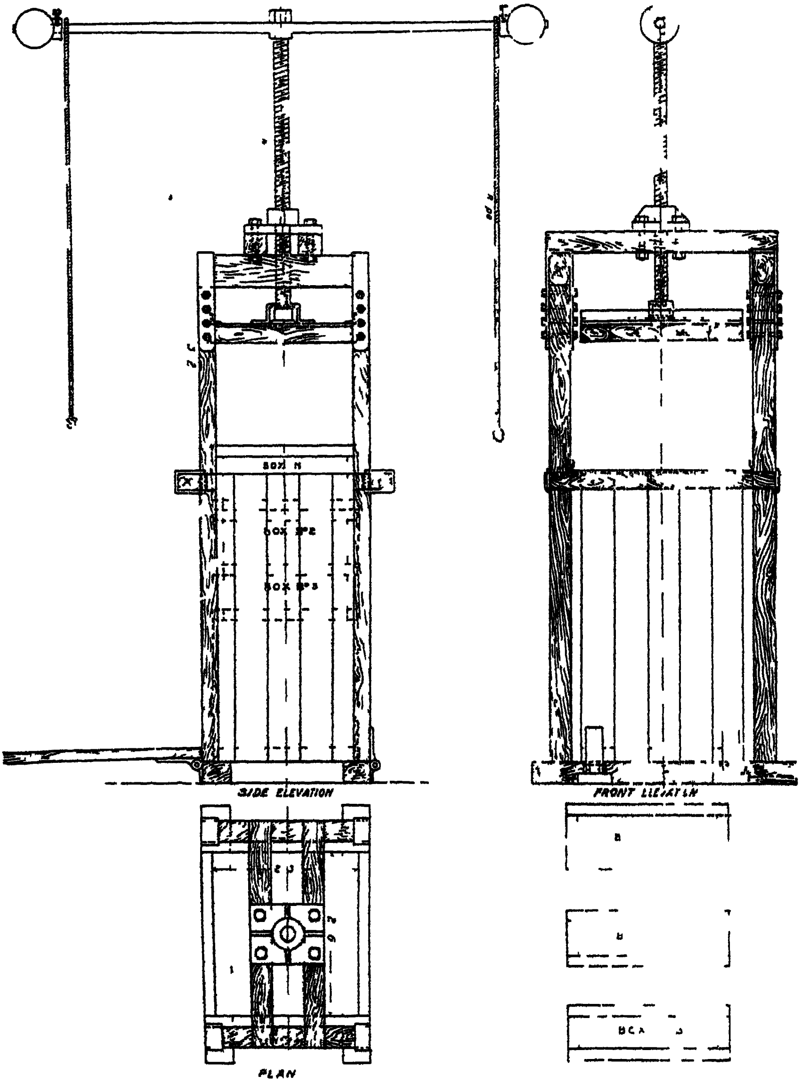
Mr. D. van Zijl, of Dichaking, Kuruman, writes:—"We are greatly troubled in these parts with a certain insect generally called Corn Cricket. As it causes an enormous amount of damage to growing crops, I should be very glad if any of your readers could suggest a remedy for this destructive insect. In December, during the first rains, they hatch out just like small locusts, and December being in this district the month for sowing and planting, the insects develop simultaneously with the growing crops, and start their work of destruction when the crops are in bloom. They climb up the mealie-plants, causing little or no damage to the stalks and leaves, but eating, within the space of a few minutes, all the grains of the mealie-cobs. They also consume the flowers of all creeping plants as pumpkins, water-melons, sweet melons and beans, just when they make their appearance. Last January I had a splendid plot of beans, of which I expected a yield of fifteen muids, but, as described above, no sooner had they come in flower then the corn crickets appeared on the scene, and all I reaped was two and a half muids. Even all shoots were destroyed by them; and this work of destruction is not limited to one year only, but goes on year after year with unabated vigour. I have tried several kinds of poison to kill the pest, such as Cooper's dip and Little's dip, and even Wolve poison. A strong solution of tobacco dip also failed to kill them. I should, therefore, be greatly obliged if you or any of your readers could advise me what to do to get rid of this pest."

We are not aware of any remedial measures having been used in this country against these insects. We would, however, recommend Mr. Van Zijl to give a trial to poisoned bait as used against locusts. Several of these poisons are described in the *Agricultural Journal* for January, 1903. The endeavour should be to ascertain the breeding spot of the pest and, as this is probably somewhere on the veld, the ploughing of the cultivated land probably preventing the escape of the young hatched from eggs laid there, the vegetation could be very effectively sprayed with the arsenic-soda-treacle solution, for instance, which should do excellent execution amongst the "Corn Crickets." This has been recommended for the destruction of a similar pest in

Colorado. We should be very glad to receive information regarding the damage done by this pest in any part of the Colony, and also specimens of the insects themselves.—RUPERT W. JACK, Assistant Entomologist.

Farmers' Wool Presses.

In the last issue of the *Agricultural Journal* an article appeared on the subject of Farmers' Wool Presses which gave the plan of



Plan and elevation of Wool Press made by Messrs. Cunningham and Gearing to the design of Mr. F. W. Powne, M.L.A.

one designed by Messrs. Sephton. Mr. J. M. Orpen, the writer of that article, writes further: "I enclose herewith a plan and elevation of the Wool Press made to the design of Mr. F. W. Powrie, by Messrs. Cunningham and Gearing, of Atlas Works, Cape Town. Mr. Powrie has found it quite equal to packing the wool put out by twenty-five shearers, and that it is easily managed. The makers are now constructing a machine on the same principle, with the difference that a lever instead of a screw is used. The screw press, invented by Messrs. Sephton, has the advantage that it can press several bales at the same time in cases alongside each other. Publishing the different plans should stimulate manufacturers, invention and use." We quite agree with Mr. Orpen, and publish the plans and elevations herewith in order to concentrate attention on this subject.

Malkop or Gid—Sturdy—Turnsick in Sheep and Goats.

Several correspondents again enquire for information with regard to the above disease. This affection is caused by the presence of a cystic parasite, or bladder worm which lives in the brain cavity. The parasite is called *Coenurus cerebralis*, and is the cystic or intermediary stage of the tapeworm of the dog called *Taenia coenurus*. The sheep or goats become infested by picking up the eggs of this tapeworm, which are scattered all over the veld, and into the drinking water, by dogs or similar carnivora, which are infested with the tapeworm.

Life History.—When a young sheep picks up the mature segments or eggs of the *Taenia coenurus*, with the food or drink, the shells of the eggs are soon dissolved in the gastric juice, and the embryos are set free. By means of their six hooks they pass through the walls of the stomach or intestine, and very probably penetrate some vessel and are carried by the blood current to various organs of the body. Those which arrive at the spinal canal, or cranial cavity are almost the only ones which continue their development. On arrival in the brain the embryos lose their hooks and are transformed into vesicles.

The *Coenurus* requires about three months for its completion, when it appears as a thin walled bladder about the size of a pigeon's egg. It contains a clear watery fluid, and attached to the wall of the bladder are a large, but variable number of small white nodules, about the size of a mustard seed. These are the heads of the future tapeworms. If the whole bladder, or bag of heads, were swallowed by a dog, each of these heads is capable of developing into a distinct tapeworm. Fortunately, in the migrations of this parasite many are lost and destroyed, and many others fail to arrive at maturity, hence there are not so many cases of "Malkop" as one might expect to find, considering the number of eggs scattered by dogs on the pasture, and the multiplication of the embryos during the cystic stage of their development. Young sheep are most liable to become affected, probably due to the fact that their tissues are softer and less resistant than mature animals.

Symptoms.—Some observers recognise the symptoms which become apparent during the period when the embryo is burrowing its way to the position which it takes up in the surface of the brain. But unless there are a number of these embryos invading the brain at the same time, the symptoms manifested could be little more than suspicious of the disease where it is expected, requiring to be confirmed by a *post-mortem* examination. It is when the cysts are reaching their full development that the well known symptoms of "Malkop" become manifest. They naturally vary somewhat, depending upon the locality of the parasite. The animal may appear dull and stupid, and the face wears a vacant stare. One or both ears may be lopped, and the pupils of the eyes may be unequal in size.

The animal may persistently turn in a circle, always in one direction, or it may bore forwards, or incline to fall backwards. In many instances the movements are irregular, and in going forwards the affected animal does so by leaps and bounds. As a rule it turns towards the same side on which the cyst is situated. When it goes persistently forward, the cyst will usually be found in the anterior part of the brain. If about the cerebellum, or base of the brain, the movements are very irregular and uncertain.

Treatment.—When the cyst is situated on the superior surface of the brain, a slight bulging and softening of the bone may, by careful manipulation, be felt over the site of the parasite, the pressure of the cyst causing absorption and a thinning of the bone. In such cases an operation may be successfully carried out. A small opening through the bone is made by a trephine, which, if on the right spot, the bladder will bulge out. A small puncture should be made in it so as to draw off the fluid very slowly, after which the cyst should be twisted round and round until it can be drawn through the opening complete. But unless there is some special reason for trying to save the life of the animal, by far the most economical plan is to slaughter the sheep as soon as the nature of the nervous disturbance can be diagnosed.

Prevention.—This consists in being careful to keep all the farm dogs free of tapeworm by frequent dosing when they are suspected; and the next is to be equally careful that the dogs do not get the heads containing these bladder worms to eat.

Lung Sickness and its Prevention.

Mr. W. J. Dreyer writes from Prospect Station, Elliotdale:—"At the present time I have that terrible scourge amongst cattle on my place, *Lungsickness* to wit, and I thought that by giving you full particulars of what has occurred since the disease first shewed itself, you might be able, through the medium of your valuable pages, to recommend some cure to me, or give me the benefit of some valuable suggestions. At the beginning of January last past I sent both my wagons down to East London and despatched one of them back towards the end of January. The first ox died on the return journey at Darabe, about twenty-five miles distant from here, on the 8th February, and this was followed by the death of a second at this station on the 22nd of February, and from that date up till the 23rd instant, they have been dying at about the rate of one every other day. Up till now I have lost fifteen head, and two more have the disease on them.

"I may mention that the greater part of my cattle, thirty-two in all, were inoculated against Lungsickness three years ago, and were declared immune from the disease for a period of seven years Strange to say, I have noticed that the very oxen which were inoculated have succumbed to the disease more easily than the ones which were not inoculated. I lost two or three head before I commenced drenching the herd. I then killed an ox, extracted the virus in the usual manner, and dosed them with a quarter of a bottle of virus and a quarter of a bottle of water, making a half bottle in all, but, judging from results, this course of action has been of no avail. Immediately a beast becomes infected, I take it away from the remainder of the herd, and I do not allow the remainder to drink from the same water, or to graze where the sick beast or beasts have been running. Several of my neighbours have suggested remedies, one of which I have given a trial. It is composed as follows: One bottle of water, one tablespoon sulphuric acid, one tea cup of sugar, mixed. This remedy has also proved useless. I have opened each beast that has succumbed, and I have examined the internal organs thoroughly, but I have found the lungs to be the only part affected. In some cases the lung has been completely eaten away. One beast survived for forty-two days, and then died from sheer weakness. On opening this beast I discovered that there had been an abscess on the lung, and when it burst, the lung fell to pieces, and caused the death of the beast. One point I have noticed in particular about the disease is that a few days before the beast affected dies, the stomach swells to an abnormal size, and the ox becomes very costive, finding the greatest difficulty in passing any dung."

Mr. J. D. Borthwick, Chief Veterinary Surgeon, supplies the following memo. on the above:—Mr. Dreyer's experience is an object lesson of the advantage of prompt action in dealing with an outbreak of Lungsickness in cattle. One ox dies on the road on 8th February, a second at home on the 22nd idem, and other thirteen died by the 23rd March, and two more were affected.

It is not very clear to me from Mr. Dreyer's letter whether he drenched his cattle when he had only lost the first two or three, or whether it was after two or three had died after the fifteen. But it does not alter the position very much. Mr. Dreyer was evidently misled by trusting to the permanency of the previous inoculation, and expected at least that only a few of his cattle would contract the disease, hence he did not consider it necessary to take immediate steps to get the herd re-inoculated when the disease first appeared. The result has been that before he drenched his cattle a great portion of them had already become infected; and the drenching of such affected cattle would rather hasten the course of the disease than retard it. Hence, Mr. Dreyer naturally thinks that the drenching did no good.

If the virus taken from the affected beast was used while fresh, it certainly should have done good to all that were unaffected, especially, as Mr. Dreyer says, he removed every beast that became affected as soon as ever it manifested symptoms of the disease. It is possible and very probable that the previous inoculation had the effect of prolonging the attack in those which took the disease last. The tympanitis, or swelling of the stomach, which Mr. Dreyer refers to, is due to the arrest of the digestive processes, and the partial paralysis of the walls of the stomach. Under such conditions if a beast affected with Lungsickness gets a drink of water, fermentation commences immediately in the food contents of the rumen, which causes the formation of gas and the distention of the rumen or paunch.

As regards treatment.—The New Amended Contagious Diseases Animals Act, which is now in force in the Colony proper, and no doubt will later be enforced in the Transkeian territories, compels the destruction of all infected animals, a procedure which is by far the most economical, as recovered Lungsick animals are frequently a source of great danger for the remainder of their existence.

A TREATISE ON

CITRUS CULTURE FROM SEED TO FRUIT,

Shewing the Influence of the Stock.

By W. E. Masters

(Formerly of Grahamstown, C.C.)

(Continued from Page 453.)

CHAPTER XI.

Complex Influences.

Mongrels, Mongrelisation, etc.

The term "Mongrels," etc., is used tentatively until a better word suggests itself, to denote the influence of the *stock*, upon scion, seed, or fruit, in contradistinction to the "crosses" and "hybrids" obtained by cross-pollination.

To many horticulturists, stock-influence as a factor in fruit production may seem a doubtful quantity, nevertheless, it is a very reasonable supposition that if new varieties can be obtained by pollinating blossoms, then the forces which generate such blossoms—indisputably of stock origin—must exercise a very important function in the formation of such blossoms.

If a lemon tree be cut off below the surface of the ground, the root itself will replace that which has been cut away, and ultimately produce fruit after its kind from root-growth. Seeing then that an infinitesimal orange eye grafted on to such a stock does not produce wood or fruit by its own growth on its own root system, but is fed exclusively by the root system of the lemon, it must follow that such an atom is swayed to a great extent by the juices emanating from such a stock. In the face of this incontrovertible argument, the only possible alternative must imply that the orange bud remains an orange by its cellular structure and by the air it breathes through its branch system, which actually converts pure lemon juice into orange juice as it grows without change to its structure or its pollen.

Such a theoretical alternative is improbable, and I consider incorrect. Whilst stock-influence, so far as I have carried it to-day, has no apparent effect on the distinctive external shape of the grafted fruit, it is without doubt the dominant factor in fruit production and by specialisation we are but following a natural order. For one to affirm that stock-influence has no effect upon fruit is as rash as to affirm that no new varieties of fruit can be produced by pollinating blossoms.

Ignorance is not *proof*. Stock-influence and cross-pollination both have their proper spheres, the former with the fruit, the latter with the seed, but where one ends and the other begins, or how both may be beneficially combined, the future will probably unfold.

Stock-influence hitherto has remained an indiscerptible quantity, simply by the omission of growers to carry it to a third or fourth stage in order to relatively assess by inverse ratio the power exerted by *one* first union. This omission has been perpetuated because no experimentalist has discovered a positive or original method of analysing quantitative influence, and also from the fact that his past horticultural ethics have been absorbed in good faith.

The Creator, in creating, established sexes in practically every living thing. Botany, in pursuance of such a course, and in order to classify plant life and so make it readily understandable, establishes "families" according to certain distinctive features exhibited by the blossom. *Man*, by grafting, has evolved an order disconnected from the natural course, which for want of a better word I term mongrelisation.

That the influence of the stock *is* deemed inconsequent can be readily proven by the action of those horticultural scientists, who, in citrus culture, carefully pollinate a variety, plant the seed, and, to save a long wait, bud or graft the young seedling on to an older stock, pronouncing the result to be solely attributable to cross-pollination! Or, again, choosing the blossoms of trees for pollinating another, regardless of the stock on which it may be grafted.

That the stock is able to exert a beneficial or detrimental influence on the fruit has been shewn to lie in the differentiation proportionate to the similarity or dissimilarity existent in the fruit and life of the two stock growths. The possibility of accurately tabulating the extent of such influence depends entirely upon the amplitude of fundamental truth (fixity of type) innate both in the stock as well as in the veracity of the scion—that is to say, true seedling stock, true seedling scion.

My own investigations have unfortunately taken the form of dissipating mongrel influence (lemon excepted) rather than tending to establish the extent of them, from being compelled to work with mongrelised scions, and as it were without foundation.

In Chapter VIII., dealing with the effects of first union grafting, the absorption of influences by the scions being crossed and recrossed upon varied stocks has been commented upon and made clear.

On page 317, under the sub-heading "The Washington Navel," it has also been shewn that the ability of a scion to flourish upon any dissimilar stock is proportionate to the extent of the common assimilator animating the whole citrus family.

That there is a difference between the common element available to one scion and the common assimilator of the whole citrus family is shewn by the disagreement which tends to dwarf an unsuitable first union.

That there is a discrepancy or shortage supplied to the scion by a simple first union is proven by the enhanced growth made at second union, and the still greater growth following third union. That there is an influence imparted to the fruit by the stock at first union is shewn by the greater acidulation at third union as explained in the last chapter dealing with the lemon.

If a second union adapts the scion to assimilate a double quantity of stock juices tending to make a two-fold growth, it must necessarily follow that the scion has thereby become more closely associated *with the stock,* and the same applies also to the fruit. It is, therefore, apparent that the first union of any scion to any unspecialised stock, while it has affected the scion to a proportionately less degree than a *second* union, has, nevertheless, imparted a specific and definite element hitherto therein non-existent. Such element is considered to be *simple* mongrel inception.

When such a scion shall again be grafted on to another dissimilar stock, the further mongrel inception once again absorbed by the scion is no longer *simple,* but *compound,* seeing it has acquired a new complex element derived from a combination of two dissimilar yet distinctive stock juices.

If this has been made plain and comprehensive, then it is an easy matter to realise the inability of the Washington Navel scion to thrive upon any stock at first union, except upon that stock which shall carry the greatest amount of the assimilation element possessed as an unalterable whole by the citrus family, and under the circumstances forced upon it by grafting, which may prove inadequate for the successful discharge of the functions of both root and branch.

Simple Mongrelisation.

Taking a seedling orange scion once grafted on to a seedling lemon stock, such "simple" influence may be de-mongrelised at second union with similar seedling orange *stocks,* and the ultimate fruit may, possibly, be improved by its once union with the lemon. A scion taken from such lemon-grown-scion grafted back on to the same stock as that from whence it was cut, does not thereby eradicate its first union influence, but a further second union must be made, or perhaps even a third, to properly re-establish former conditions.

Compound Mongrelisation.

Taking a highly mongrelised Washington Navel orange as an illustration of "compound" influence, we find this phase of mongrelisation very unevenly distributed throughout its branch system; for instance, three consecutive buds growing on one twig may, if budded on to three true experimental stocks, yield three different types in leaf and fruit. One may have creaseless, smooth, soft thin leaves with a thick skinned fruit sweet and good; another may have wrinkled, bent on one side as if injured, double-hollowed leaves with thinner skin, and sweet and good fruit; whilst the third type may present hard, horny, thick, leaf with thorny branches, smaller fruit and of somewhat different flavour; thus, in working with compound mongrelised buds there is no degree of certainty that merit of any kind will be attained or maintained although, so far as nomenclature is concerned, such fruit is undoubtedly "The Washington Navel."

"Training" will never eradicate such; it can only give stock influence full sway, as fully explained previously.

Suitability of Soil.

That "soil" exerts some action upon the juices that go to form the fruit, is as apparent as the fact that soil has some action upon the growth of the tree. Citrus trees, equally with deciduous trees, have not all the same root construction, for whereas some possess a mass of surface feeders and few tap-roots, others with but little surface roots depend principally upon their tap-root system for sustenance and support.

The irregular rain periods of this country demand that a tree shall have both; thus, the acclimatised sweet seedling orange and the common wild lemon possess, in addition to an abundance of surface feeding roots, a good tap-root system as well, whereby they are able to conform to unequal rains, and make the most of a light shower or a soaking rain. Other trees, as the Seville and pamplemous, depend principally on their tap-roots for sustenance, and require continuity in moisture rather than intermittent surface irrigation, which frequently fails to saturate the deep sub-soil after a time, although it is *thought* to do so.

As mentioned before, there is a great dissimilarity in the root formation of citrus trees; nevertheless, this discrepancy may be partially overcome by preparatory training in the nursery, whereby roots may be made to adapt themselves to the requirements of the soil in their permanent site.

The most obstinate case of such root training would be in a nursery having a stiff loam, and a permanent orchard of a light or sandy nature. Success under these conditions would be quite impossible, but if reversed, that is, a light sandy nursery to plant out in a rich stiff loam, success would be obtained *with resistant* stocks.

A non-resistant, sweet seedling orange raised in a poor sand and planted out in such a loam will frequently succumb to root-rot, whereas had it been raised in a loam, it would not have got it unless the drainage was bad. Raising seed in a sand assists the roots to adapt their requirements *to* that sand, and as a loam only needs one half of the root-system that a sand does, it may die from a too ample root system if planted thereafter in a rich loam, followed by a wet season. A loam-grown nursling, planted out in a weak sand, occasionally remains stationary for years, and can only be persuaded to move by cutting it off short and using guano. This will move it, provided sufficient vitality exists in the root system, but it is kill or cure. In sands it must be remembered that white sand will burn a young tree, or one having insufficient shade branches, whereas in a red, or darker colour, the sun has no apparent effect: thus, soil, or the unsuitability of the soil, is often declared to be reason why a tree will not thrive, when, in fact, it is often nothing but heat radiation. The remedy is obvious, either shade it or darken the colour.

It should be remembered also that the richer the nursery soil or the more fertilisers added to a poor nursery soil, the less adaptable such trees become toward the poorer soils, simply by rich living shortening and thickening the roots and rootlets, unfitting them to "push for their living" when planted out in poorer soils.

Tap-roots are naturally adapted to loams and surface feeders or rambling roots to sands or poorer soils; thus a Seville, fertilised in the nursery, must be equally fed and liberally supplied with moisture in its permanent site, or it cannot succeed. Nursery training practically establishes the future tree, as when once planted out it remains as it is, its roots simply following food factors.

Therefore, as the whole question of citrus culture in this country is determined by the tree being able or unable to find food and moisture under the usual climatological conditions, so the aim of the nurseryman should be to establish such health and vigour in the nursling tree, as will enable it to stand the greatest stress of adversity, which too often is preceded by abnormal rains.

Root Training.

When a young vigorous tree is cut down, a new root growth is simultaneously started by the life innate striving to recover lost balance. In order to turn this knowledge to our account, a tree should only be so treated after good rains, or copious irrigation, and for some specific purpose. This growth, termed "recovery growth," has compelled the root and stock to exert the whole force of their energy, and may be said to actually represent the supreme effort of its life. No other growth could continue to follow on this effort unless it was in equal affinity and had been animated by the same impulse. The ability of a *scion* to produce other equal effort would depend upon the power of its "call" on the stock which would decide whether or not it could continue what the stock system had begun without it.

Thus, a pamplemous or Seville, which rejoices in a tap-root, needs some previous manipulation to adapt it to soils for which its seed characteristics have not fitted it, and therefore we previously shortened its little one-year-old root when planting out in the nursery.

At two years old, approximately, one year now in the nursery, if such seedling or stock be dug up at the proper time and in proper weather, and its two or three tap-roots again shortened back to three or four inches *below* the former cut, and again replanted with the same care as before, we shall find in a few days we may insert the trained bud.

When this has taken, the tree may be cut back to it, and growth will develop without stoppage. This cutting-back combined with the vigour of the specially selected bud, will compel the root to adopt the root-system we desire it to take, and simultaneously develop a healthy branch growth. The tap-root will be modified enabling it to do better work in the site we have selected for it. A Seville treated on these lines is acclimatised, soil-trained, root-trained, and branch-trained, and has acquired almost the perfect harmony of the ungrafted seedling tree. Its "education" is completed with digging out, trimming, and planting in the orchard, where it will conform to either deep or shallow soils. Surface irrigation will compel a mat to form, but it will rest with the orchardist whether such mat shall be on the surface or two feet below it. A wise modification of dry cultivation and ample intermittent irrigation seems most desirable.

The Jaffa System.

To illustrate a phase that rootage is dependent upon the fertility of the lower soil in surface irrigation may be cited the system (?) employed in Asiatic Turkey. In most of these groves one particular orange is cultivated, though not as a stock, nor as a seedling. Most or all of these groves are leased to vegetable growers, who in return for their services in harvesting have the right to cultivate between the trees. Every lateral root they touch with the spade is traced back, if not too deep, and cut close off to the tree. The top spit of ground, a foot or more, although lost to the tree, is, they claim, of more service to it by their watering and cooling the ground in vegetable growing than would be the case if the roots matted near the surface. The experience is built on years of practice, and although their argument is apparently true, what really happens, I take to be, is that their working and watering keeps a naturally porous soil more opened, whereby the finer particles of the fertile or ripened surface soil is carried down by their irrigation, and thus supplies the deep seated feeders with available nutriment in addition to what the lower soil carries of itself.

Anyway an orange is obtained as sweet as if it fed on the surface, and although there is no "science," no experts, no nurserymen in Jaffa, there *are oranges,* which take beating! So far as I could learn from the Armenian who claimed to have been "born in a grove," they gave up budding previous to 1901, preferring to strike slips from the best trees, and to try the Seville *again* after it had failed *once* seemed to him very absurd. Yet the behaviour of the Jaffa on the Seville only seemed to need a *second union* to establish the Seville stock as prime favourite. There was every indication of first union grafting, *viz.,* irregular bearing, smaller fruit and dwarfed tree. At one time a heavy crop, then a period of recovery without fruit, and a heavy crop again. In South Africa that period of recovery would, in a drought-stricken portion, have meant death, a death that would probably be said to have occurred from bug, or scale, or fungous disease, or anything but the effect of first union under stress.

There is another rootage factor I have noticed, namely, that a tree grown in soil having very fine particles, will not thrive in the coarser particled soils frequently met with to the north of Mafeking. Such trees require propagation *on the spot* as seedlings; or in the case of grafted trees, they require third unions made on stocks, actually grown on such coarse particled soil.

Complex Influences originating New Varieties.

As has been shewn under mongrels, it is possible to produce entirely new varieties of fruit, specialised by budding or grafting from one dissimilar stock to another. It is, however, a far easier matter to originate new varieties of apples with their multiplicity of stocks than to produce a new orange from the restricted choice in stocks, for taking all the gradations of the citrus family and placing the high-grade seedling or pedigree orange *on the top,* with the sourest lemon* *at the bottom,* we can see at a glance that as the highest standard of merit in an orange lies in a true combination of sweetness with flavour, so any departure from a high-grade orange stock must necessarily detract from such excellence, the more the use of low grade or acidulating stock is practised, whether for propagation by budding, etc., or for their propagation by seed from the fruit so produced.

As regards flavour originating from soil, something might be said on the matter, but as frequent mention has been made, it seems rather superfluous to say more, seeing it may be easily referred to.

---

* I exclude mention of *Citrus trifoliata.* which is a useless thing for South Africa.

New varieties should be obtained from seed by the recognised practice of cross-pollinating seedling trees, but budding or grafting such new variety on to any stock becomes conspicuous or inconspicuous according to the amplitude of divergence between the innate characteristics of the *fruit* of the two stocks. Seedlings obtained from grafted fruit often present many strange freaks, due possibly to a weakening of some characteristic in the formation of the blossom, allowing certain pollinating factors ample or limited sway, or more probably may be due to the absolute forces of stock influence controlling the formation of the blossom in an eccentric manner.

Many of these "freaks" are seedless and seem worth propagating; nevertheless, the financial query obtrudes itself: In what way are they *better* than the pedigree varieties we already know if worked on the Masters system? If this system becomes recognised at its proper value, there will be no more attempts at "trying" high-grade varieties on certain stocks to see if they will grow!

Prior knowledge will assure prior success. So far as I have carried my own experiments to-day and noticed the new varieties of other growers, it seems advisable to discard all else than seedlings grown from the influences of the highest grade of orange stocks, acting upon the highest grade of pedigree oranges extant, either by stock-influence or the artifice of man supplying the blanks in the seedless varieties.

Whether such varieties will equal those already known to exist in the Mediterranean and elsewhere I greatly doubt, but with the knowledge conferred by the publication of the "Masters System" their merit may be retained if new scions or trees for a new start shall be imported into South Africa.

There is an interesting theoretical inclusion in connection with "influences originating new varieties" that might be briefly explained here. An orange produced in one country under specific conditions from which a scion is taken to be grown in, let us say, the other side of the world, would depend for its successful (mis-called) "acclimatisation" in the new country entirely upon the continuance of its stock sequence, *and not upon climatic conditions at all.*

Thus, if the chosen orange was growing upon an indigenous seedling stock in such country and was grafted upon a similar indigenous seedling in the *new* country, it would be incorrect to say it had acclimatised itself at once in the new country, seeing its success would rest upon the simple fact that its stock-specialisation had been continued.

According to the degree of its divergence in its "failure to acclimatise itself," so the greater or less would be the differentiation proportionately existing between its specialised stock system of the *old* country and its dissimilar, unspecialised stock adaptation in the new country *at simple first union.*

Thus, taking the original Bahia type of orange growing upon any specialised stock in Brazil, we see the effect of its absorption of mongrel

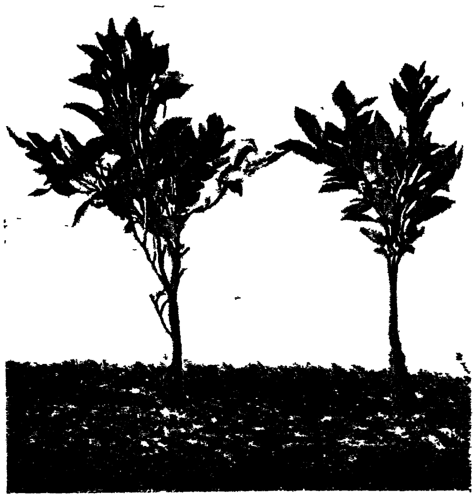


Fig. 4. Pamplemous Stock—Washington Navel. First union grafted on to Pamplemous stock. Six years in position. Now 10 in. high.

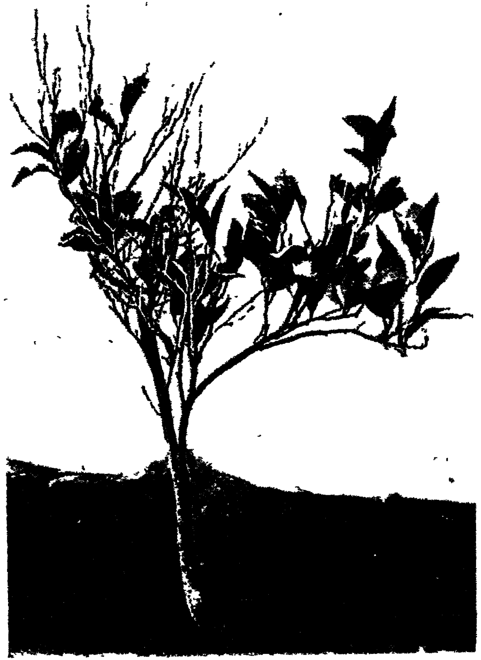


Fig. 5. Washington Navel. Second union grafted on to Pamplemous stock, four years in position, showing soil inequalities. Soil being only suitable for lemon or orange roots.

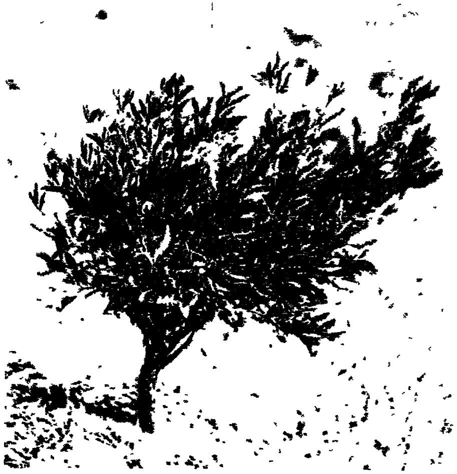


Fig. 1. Cinnamon Orange on Seville stock Fi years old, showing effect of first union grafting.

Fig. 2. Cinnamon Oranges from tree shown in Figure 1. Second Union Grafted on to Seville Stock. 18 months old. (Portion of a row.)

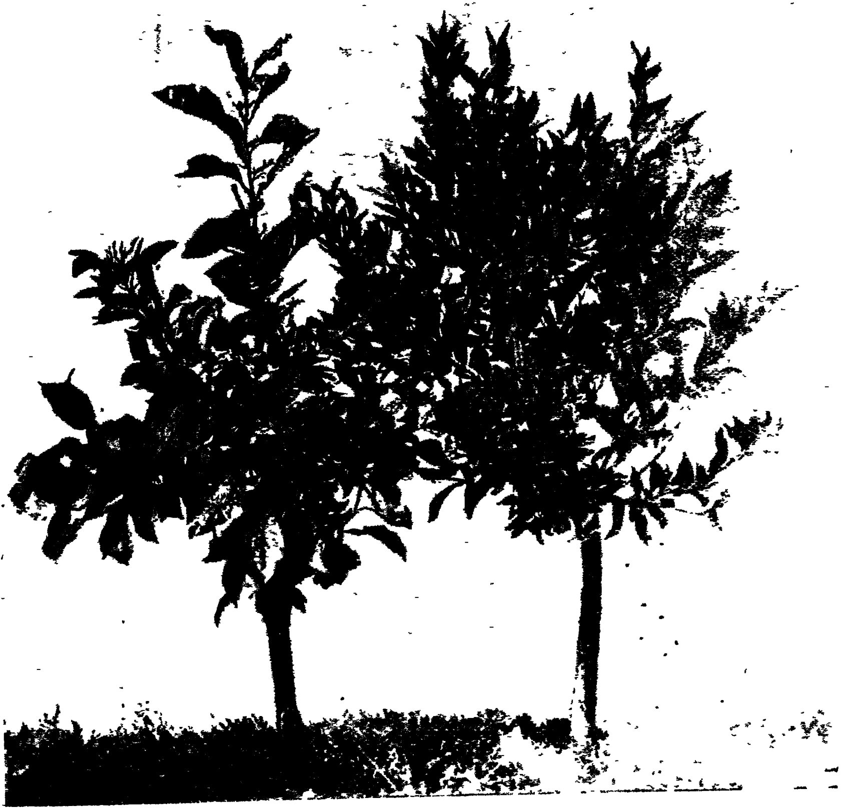


Fig. 3.—On the left Seville Stock control. On the right Cinnamon Orange from former tree, third union grafted on to Seville Stock. 9 months old. Note that it has outgrown the Seville Stock on the left.

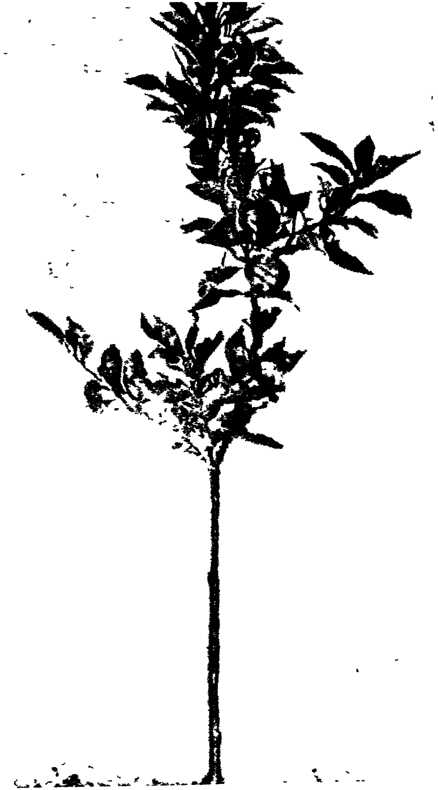


Fig. 6.—Washington Navel. Third union grafted on to Pamplemous Stock. Five months old, six feet high. (Four feet above the bud).

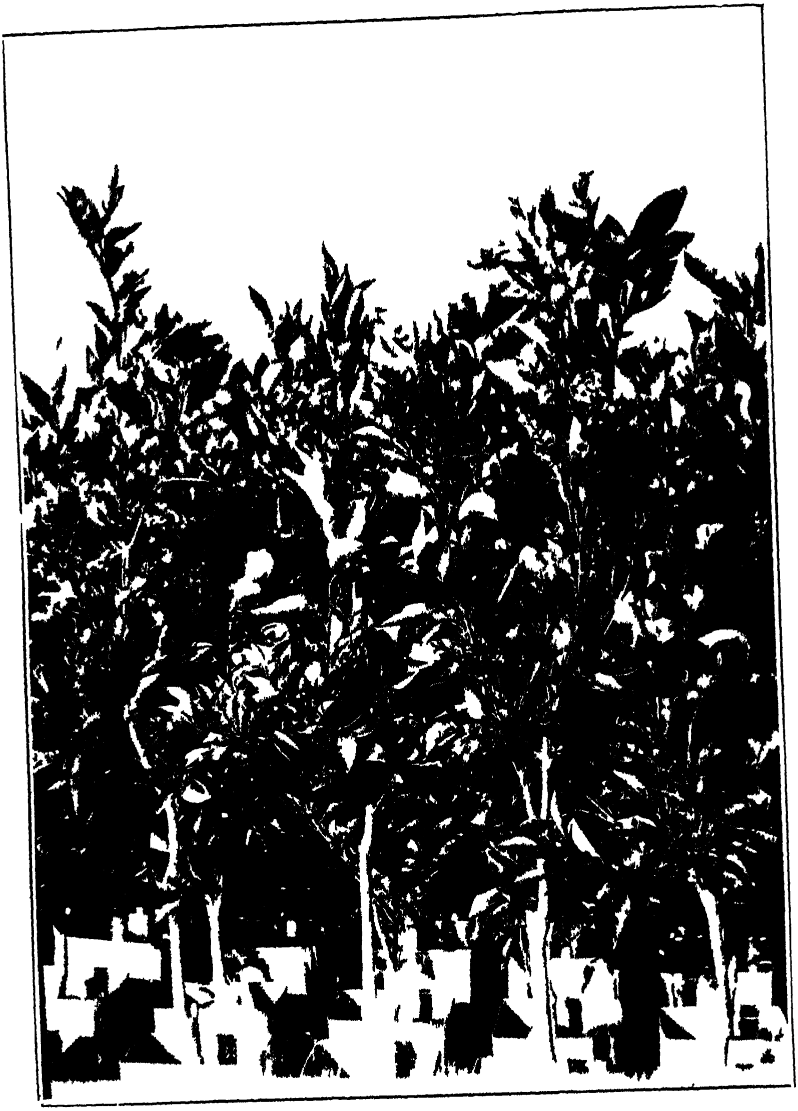


Fig 7.—A block of Washington Navel Oranges Third union grafted on to Pamplemous Stocks Three to five feet high, six to nine months old Four year old stocks

influences and its "training" upon dissimilar stocks more or less fixed or superseded or eliminated in the new countries to which the scions have been transferred, and from whence originate the "Washington" navel, the "Australian" navel, the "Sustain," and various other navels. On the same hypothesis, a hypothesis that may be said to be actual fact, the failure to "acclimatise" the Bahia navel in several parts of America, would be found, if investigation were possible, to be attributable to nothing but the order of its "union" with stocks of greater or less similarity, with *mongrelisation intervening.*

If a "Navel" characteristic has any commercial advantage in any orange, surely it is an easy matter to produce it on any citrus fruit?

Crossing or Crossing Stocks.

This term implies the act made by changing scions from an acidulating stock (lemon) back again to a sweet seedling orange, or seedling mandarin stock, having for its object the retention of sweetness and flavour in the fruit, coupled with the advantage of greater growth made by the lemon stock at first union, without extensive fruit depreciation.

There are many growers who prefer the lemon stock for naartjes,* the writer among the number, and the only way in which the acidulating action can be minimised is to "cross" back (alternate) to a seedling stock, using such as the propagating trees for the lemon stock. To continue the constant use of "lemons" indefinitely would naturally spoil the fruit; as previously explained.

Admitting, then, that the tendency of the lemon stock is to acidulate the fruit as well as to delay ripening if the ground is moist, we have no wish to further exaggerate these defects, nevertheless we desire to propagate from such a tree to the best advantage. To overcome this difficulty we commence from a beginning by an illustration to make the matter clear, to shew how the least possible active influence on the fruit may be secured, without interfering with the known growth the lemon stock yields it. We take from an adult seedling naartje tree upright wood for *grafting,* and the *larger* and *longer* the scions are which we shall use as *grafts,* and the older the age of the seedling naartje tree is from which we cut our *grafts,* the less action the lemon stock can have upon the *fruit,* owing to the larger extent of *graft* being able to diffuse the acidulating stock-juices more advantageously.

Buds must not be used, or the action of the stock will be too pronounced in the fruit. Presuming, then, that we have made such a first union to lemon tree and we are anxious to propagate from it, we must first take *buds* from it, and *re-bud* on to the same or another similar *seedling* naartje tree, which scion, after two or more growths have been made, is the wood wherewith to *graft* any number of lemon stocks. Care must be exercised that the naartje stocks on to which we *bud* are true seedlings and not growing on a stock. It will be noticed we *graft* scions on to the lemon stock, and *bud* scions on to the naartje stock, from whence we proceed to *graft* the requisite number of stocks, to complete the operation of "crossing." A *bud* will give stock influence more sway than a *graft,* particularly if the stock is a vigorous grower and has been cut down. Fruit grown in this manner has all the growth advantage of the lemon stock, with the least possible lemon flavour, and to many it seems an actual improvement on the fruit produced by the seedling naartje itself, both as regards size, appearance and flavour, being not so excessively sweet at maturity.

---

* South African name for Mandarins and Tangerines.

The same method of alternating with the lemon can, of course, be adopted with oranges, but I cannot recommend it, as the orange itself is a better stock than the lemon.

Spice tangerines (locally known as Cinnamon oranges) specialised to Seville, will produce almost as fine fruit as the lemon, and whilst not being so large, are, nevertheless, firmer, smoother and sweeter.

In concluding this heading, I would remark that crossing alternately on to the lemon stock has very little to recommend its general adoption except in so far as to give a place for the lemon stock in the orchard.

With regard to the statements made, I am fully aware I am treading on dangerous and debatable ground, but in the making of new or "pioneer" roads, some one has to incur the danger of a departure from the well-beaten tracts of antiquity, so I incur that risk. I trust it will not be many years before the statement I make "that budding and grafting do not produce the same result" will be verified by others no matter who obtains the credit or discredit.

CHAPTER XII.

STOCK BEHAVIOUR IN SOUTH AFRICA.

The Pamplemous Stock.

Whether the Pamplemous or Pamplemousse of South Africa is the "Pomelo" of other parts of the world I am unable to say, having no personal experience.

With regard to the Pamplemous of this country as an available stock for "training" on the "Masters System," I prefer any of the common seedling oranges for parts where root-rot is unlikely to occur, and the Seville where a resistant stock is deemed necessary.

Both these oranges are superior to the Pamplemous, viewing the latter simply as a stock on which to grow fruit; but where water is a scarcity the Pamplemous stock is undoubtedly an undesirable one, seeing it takes more water to keep it moving than any other orange, and yet gives the poorest results for such intermittent watering.

This indicates that the best results derivable from the use of this stock would be met in a low-lying, constantly and naturally moist situation, and not on the loose and open sandy soils which constitute the greatest feature in so many of our South African orange groves.

The conformation of its leaves, together with its root construction, favour this indication, as its leaves are thick in texture, opaque, with very small translucent pittings, whilst its root, tap-rooted, is thick in the laterals and coarse at the root-hairs or feeding extremities, both characteristics certainly indicative of its breathing and feeding habits.

Theoretically, the Pamplemous (judged superficially) should make an ideal stock for the Navel orange class, on account of the great similarity existing in leaf appearance, but in practice this theory has not been substantiated, seemingly proving that external appearance is no indication of the amount of assimilative juices possessed in common by any two dissimilar varieties of citrus.

In defence of the theory, however, it should be stated that with this stock, as with the Seville and the lemon, I have not been able to commence any work where the "Washington Navel" orange is concerned, with anything but highly mongrelised scions, and I still think that a real high-class Bahia Navel direct from Brazil could be improved at third union with this stock if raised from Colonial grown seed in the way previously described.

With the lemon stock, a "sweetening fertiliser" is an utter impossibility, but with the Pamplemous such a fertiliser is a distinct success, and as wood ashes cost nothing but the labour to load it on the waggon and ride it to the orchards, throw a shovel-full round each tree; it well repays the trouble in improved fruit.

The flavour of Pamplemous grown pedigree oranges fertilised with wood ashes comes close to perfection in the early life of the tree in second and third unions, and although somewhat milder* than oranges produced on true orange stocks, the aroma is as good or possibly better than if the fruit had been grown upon a common seedling orange stock, *without* such fertiliser; moreover, seeing it is utterly impossible to predetermine or say what influence predominates in the bud chosen over the other bud *not* chosen wherewith to bud a certain stock, so the Pamplemous stock makes a bad or indifferent first union growth *accordingly as the mongrelised bud finds more or less congenial juices on which to call,* and produces fruit in accordance with the predominating element contained in the chosen bud.

---

* "Milder" does not mean *insipid.*

The Pamplemous stock will often give a fictitious first union growth, and a faulty second union growth, even if the scion for the second union be taken from the apparently properly-affiliated first union tree. This is not overcome until a *further* union from the second union tree makes a third union.

Or, again, a scion taken from such deceitful first union will give at second union abnormal wood growth, and not bear for several years, proving beyond dispute that one bud containing mongrel influence budded on to a stock transmits and distributes its peculiarities as irregularly and as unequally in its new growth as in that of the tree from which it was taken.

To make this plainer:—

A mongrelised bud, say a "Washington Navel," has been cut from a lemon stock, before which it came or grew, on a Seville stock now to be budded on to Pamplemous.

There has been an influence imparted to it by both stocks, the lemon and the Seville. There is an additional influence arising from a compound of both stock influences, originating a new influence termed "compound mongrelisation," which is not regularly distributed throughout the tree; in fact, it would be quite correct to say that mongrel influence, meaning the influence of the stock upon a dissimilar scion, never actually unifies by the process of grafting. Thus, a bud may take readily with a stock, or, in what seems a most unaccountable manner, do the exact opposite, according to whatever combination of compounds happens to be uppermost in the particular bud chosen, favouring or declining the union with the new stock.

Grafting is, therefore, not the natural course of nature, but the artificial handiwork of man *seeing no such peculiarities manifest themselves in a true seedling tree.*

In a general way, as regards first union grafting on the Pamplemous stock, it can be said that this stock contains no greater available element of the common assimilator than any other member embraced within the citrus family, and, therefore, makes a bad first union, but any scion may be specialised to the Pamplemous stock without an actual unmarketable depreciation in the fruit resulting, provided a sweetening fertiliser is used, as often as the fruit becomes "smoky," meaning by this ambiguous word, the peculiar flavour transmitted to the fruit by the Pamplemous stock when it is specialised* to the pedigree orange growing above it.

As a fruit producing stock specialised by training to its scion, the Pamplemous may be defined as inferior to the orange stock in the ratio of two to one, but superior to the lemon stock in the proportion of fifty to one.

The open condemnation and increasing rejection of the Pamplemous stock in favour of the lemon originates from the failure of growers or of the propagators to associate and contrast the methods which comprise successful orange culture throughout the world with the stock failures originated solely by lack of continuity in method, and the impossibility of creating specialisation by disconnected first unions.

---

* See "training"

A scion to grow well on the Pamplemous stock must be cut from a tree already growing well on a similar Pamplemous stock, but if the fruit of the latter tree is already strongly impregnated with "stock influence" it must be "crossed" as described for the lemon or the flavour will be strengthened two-fold. Crossing is, however, a far easier matter with the lemon than with the Pamplemous, and I do not recommend it.

I would rather recommend the specialised Pamplemous being planted out in their thousands at third union than to advise the planting out of *one* lemon at first union, seeing there is no comparison at any time between the fruits of *third* union with that of simple "firsts."

If *size* constitutes merit, then merit is secured by third union or specialisation with the Pamplemous as stock, but this is an argument of speciosity, as *merit* in an orange is calculated by sweetness and flavour rather than by size, unless the latter also includes the two former essentials.

The Pamplemous compared with the Lemon.

In point of growth, judged exclusively from the behaviour of one simple first union, the lemon makes fully three times the growth of that made by the Pamplemous under the climatic conditions and average citrus soils of South Africa.

This growth is reckoned, not only from the time the seed is planted in the ground and until the tree is potted off "ready for sale," but even afterwards when the tree is planted out in its permanent site; for, whilst a first union lemon often grows well for many years, the Pamplemous, on the other hand, frequently dies off, or dies back and sprouts again after soaking rains, only to eventually succumb at a later stage and to the greater annoyance of the fruit grower.

As shewn before, whatever merit the lemon possesses as a stock rests exclusively upon the growth and the fruit of first union grafting, because an orange scion can never become specialised with the lemon stock without rendering the fruit quite unmarketable and worthless for anything.

The case is different with the Pamplemous because the fruit of the stock *is nearer the* orange, and, therefore, does not depreciate the orange to the same noticeable extent.

There is also another point of scientific interest between the two stocks, namely, that the "commoner" or the nearer the stocks shall be to what once were the original orders or generative stocks of the whole citrus family, so they will possess the greatest amount of the common assimilative elements of the whole, and accordingly as selection or "improvements" by grafting and by seed from thence have effaced or effected deviations from the original order, so the new variety is able or unable to utilise the "old order" of available juices proportionate to the extent of what yet remains of them in their present system.

The common wild lemon, in my humble opinion, is one of the founders of the present citrus group, seeing it will make the best first union growth of any stock in the whole family with any scion of the same.

The Pamplemous will not do this, and without reverting again to ancient genealogies, it possesses less of the common juices which are absolutely necessary to promote a certain growth at simple first union than does the lemon.

As shewn before, the first union grafting is an error of the past; now that the "Masters System" has been given to the world, will be a mistake no longer perpetuated.

Hitherto the merits of any particular stock have been decided by the favourable or unfavourable behaviour at first union, but now "specialisation" made by training and by selection supersedes it entirely.

There can be no more "trying," chance or guess work where citrus production is concerned, because *knowledge* has been promulgated.

Taking, therefore, the desiderata of any stock, our endeavour should be to follow the pattern laid down by nature, and create by such knowledge the towering standard-sized tree of the true seedling orange, with its tens of thousands of fruit *with pedigree quality* before we condemn any scion or any stock in ignorance of what may be accomplished from knowing the true factors that produce them.

The lemon cannot be specialised because the whole improvements effected down the ages of time in producing the present merit of the named varieties *would be lost thereby.*

A scion on Pamplemous stock may become specialised to its stock and grow as large and bear as heavily as the standard-sized seedling orange, but the fruit at specialisation, although of abnormal size, will not have attained the same excellence as if its specialisation had been made on to an *orange stock.*

Constant fertilisation may do much, but must prejudicially affect the fruit and the tree at some later period.

If it is remembered that the greatest claim of the Pamplemous stock is its resistancy to disease, then it follows that if another stock can be found producing better fruit at specialisation and yet equally resistant to root-rot, it would naturally be rejected in favour of such stock.

Such will be found in the *Seville.*

The Seville Stock.

The Seville is the best resistant stock for an orange.

In my humble opinion it is one of the founders of the citrus family, as known to-day, and although I feel a desire to give reasons for the statement, a practical guide to fruit growing—as I trust this book may be found—must not contain too much "theory," otherwise practical results may be classed as "theory also."

A pound of practice is worth a ton of theory; nevertheless, every practical grower should be allowed a little latitude in imagination, as it serves a useful purpose in turning unproductive land into the future orchards.

The Seville has been tried by hundreds of us on *first union principles,* and pronounced a miserable failure without exception, and so it undoubtedly is.

Of the thousands of growers who have condemned the Seville throughout the world, *not one* has condemned it *at specialisation.* There are no growers, so far as I can learn, where the Seville has been specialised with the "Navel" type, who pronounce it anything but the best resistant stock, and I may almost add the *only* resistant stock of the whole citrus family.

The whole question of "stocks" has been exhaustively dealt with in Chapter V., therefore, the uses and requirements of a stock need no further elucidation.

The question now to be considered resolves itself into:—

"Which is the best stock for oranges, and why?"

The shortest possible definition in answering the question may be said to be: That stock which, whilst giving perfect immunity from the ever-threatening disease of *Mal-di-gomma,* will permit of specialising the scion to its own particular stock system with the minimum amount of depreciation in the fruit grafted above it.

Specialisation, as has been mentioned before, signifies growth in the scion, as free and as unrestrained as if it were actually part and portion of the seedling itself.

The Seville may be specialised easier than any other orange, the indigenous sweet seedling orange excepted.

If orange growing has any commercial value whatever, then the *best stock* must be studied, and the following explanation carefully considered.

It is useless for anyone to refuse to believe in the merits or demerits of the Seville stock without trying it under the Masters training system, for wherever the Seville has failed to give satisfaction it has never had fair play, and has been condemned unjustly and in ignorance of its real worth.*

---

* I dug out and threw away one half of the bought trees on Seville stock, inside of three years.

No one yet has ever pieced the facts together that go to make up success in fruit growing, nor have they ever yet ascertained the true influence of stock factors.

If an open mind can be brought to bear upon the whole facts in the case, *the Seville must win*, giving future success to him who *can* and *will* analyse issues over him whom blind prejudice prevents from doing so. The factors in the case must be briefly recapitulated, and it does not follow at all that because it has been misunderstood *once* it will fail again in the light of the knowledge of the necessity for specialised continuance.

Putting my own experience first as being of *least* consequence or proof that the merits of the Seville outweigh the claims of all other resistant citrus stocks for oranges, I cannot, of course, shew old established groves in full bearing, but seeing the weak point is the absence of abundant growth in the scion and that it has been condemned for that reason, and practically nothing else, it should count for something if the weak point can be shewn to have been overcome.

As has been related previously, my first favourite stock was the lemon at second and third union, and until the sour unmarketable fruit clearly demonstrated it to be the worst possible stock for *oranges*, had my full confidence, and judged from growth results alone, could not (as I then thought) be improved upon.

Having heard from many growers that the pamplemous had been proved to be a perfect resistant stock if budded or grafted knee-high, I planted out some 8,000 young pamplemous in my nursery, in case root-rot should carry off my orchards, the whole of which were worked on the lemon stock.

A couple of years afterwards I planted out about ten thousand young Sevilles—the seed of which I believe came from Portugal—in order to have a variety of stocks, as nothing definite could be gleaned of stock behaviour in this country outside of the lemon, which is not rot-proof, and the common seedling orange, which was failing almost everywhere.

To obtain Seville seed to grow stocks is not the easy matter in this country it seems to be elsewhere, and budding cannot be done under two years to get the best results.

Having now the experience which originated the immense growth in the case of the lemon, I budded sufficient pamplemous stocks at first union to make "wood" wherewith to bud the other remaining stocks.

Of the whole of this number—that is, the first union pamplemous—there was hardly one scion that made a decent growth under the ordinary honest conditions of nature, the Jaffa, or blood, being the worst, and probably the Valencia Late the best. This latter stock apparently specialised at second union, which it will do with any stock, including the Seville.

The second unions with pamplemous taken from the ordinary wood of the first unions did very much better, but, nevertheless, did not flourish in the same way as the second union lemon had done. which I know now to be due to the fact that the strength of the first union growth had diffused itself from not being taken at the end of its first growth, or rather, to speak correctly, before making its *second* growth.

Several first unions then made have stood in the same place for nearly five years, carefully tended and watered, and to-day those that are still alive are below fifteen inches high. One *dwarfling* stock that failed to take was budded two years afterwards with a second union bud and shot up two feet high in a short time. Those that died, succumbed to every indication of old age, or wasting away. They refused to grow.

Thus, first union grafting on to the pamplemous was an absolute failure so far as growth was concerned, if I exclude a few Valencias and a few St. Michaels.

Second union scions held on well through the dry weather then intervening, but even when budded on to large three-year-old stocks, could not succeed in persuading the stock to furnish the exact nourishment they evidently needed.

It was not until third unions were made, taken from second union wood, selected for vigour, that any real growth manifested itself; nevertheless, such growth was even then considerably less than the second union, as had been made by the lemon.

At this time my definite training system (as previously detailed in Chapter IX.) had not been properly co-related throughout the various experiments I had made, and specialisation had only been created in a slow laborious manner without vigour. (If it be remembered that in working with such slow growing, slow maturing trees as citrus, it takes years to prove one point, and if a mistake has been made or an apparently inconsequent feature missed, the whole matter may have to be repeated, often with the concurrent loss of interest that gave excitement to the first experiment; and I may add here that the "Masters System," simple as it seems to be *now,* has had many narrow escapes of being lost altogether by the common error of calling the working of nature's true undeviating law—"freaks.")

There seemed to be a deficiency in the growth for certain. Was it not that the pamplemous stock was naturally much slower growing than the lemon? No, it could not be that, as I had pamplemous one year younger than lemons that had outgrown the lemons in four years growing side by side.

The pamplemous stocks were larger and more vigorous than the lemons at the time I got the phenomenal growth out of the lemon, but, although the stocks grew so well, I could not beat the lemon, or even equal it! Why?

In thinking it over closely I saw the point I had missed, namely, that the wind had not broken off the healthiest and strongest first unions wherewith to make seconds.

Being of an economical turn of mind, I wanted to keep the best trees, and only budded from those that could well spare "wood" the bulk of whose vigour had diffused itself.

From that day to this I have had no difficulty at all in producing equal "phenomenal" growth *on any citrus* stock, but such growth carries a large proportion of stock influence, and needs proper regulation, as has been shewn under "Training."

Some may remark here that this heading should concern the *Seville*, yet nothing but "Pamplemous" is spoken of.

True, but it was the failure of the lemon stock to produce high-class fruit that proved stock influence, and it was the failure of the pamplemous to behave in the same way as the lemon that shewed wherein the growth factor lay, and made a demarcation possible.

It was the combined knowledge furnished by the lemon and by the pamplemous that originated "training," and it was "training" that not only proved there is but one stock for an orange, *but exposed such a vast field of horticultural ignorance in the methods employed to-day, that the present generation, each in his own sphere, will do his utmost to remedy forthwith.*

There is only one *resistant* stock for an orange, and that is the *Seville.*

There is only *one* stock at all for an orange that is *not* resistant, and that is the sweetest flavoured seedling orange acclimatised, soil-trained, and ready to hand.

To establish growth, specialisation *must* be established.

Specialisation cannot be established without allowing stock influence full sway.

When the stock is able to exert its greatest amplitude is when the scion which has been grafted above it is in the highest state of affiliation therewith, and freely and gladly[*] identifies itself with, and enters fully into sympathetic affinity with, every humour of the stock as if it was actually a part of its own natural created life.

In the case of the lemon, such stock humours will result in acidulated unmarketable fruit; with the pamplemous, in peculiar flavoured fruit; with the Seville, in perfectly good and marketable fruit; but the best stock giving the highest perfection is the sweet seedling orange.

Specialisation, moreover, gives immense fruit with any stock, which is a permanent feature as long as sufficient growing room, ample nourishment and adequate moisture is secured for the tree.

---

[*] "Joyfully" would seem a truer word.

A very dry season which fails to supply the requirements of the tree in respect of food and drink will necessarily entail a corresponding depreciation in the size of the fruit, by limiting the roots, because, although irrigation may do much to supply *moisture*, it has less than one half of the fertilising properties of *rain*, either to produce growth or fruit, or to assist in ripening the latter.

Seasonable rains are necessary to grow large or high-grade fruit,* and a vigorous tree, strong in twig and branch, in perfect harmony with the weight of the fruit, can only be supplied by man in following the strict law of natural conditions.

A slender, weak tree, carrying large or weighty fruit, is not a natural tree, but an unbalanced deformity and a poor imitation of the liberality of nature. It is the off-spring of ignorance of the fitness of things, and similar evidence has unjustly condemned that magnificent stock the Seville, which in its own natural life and vigour refutes the charges made against it.

The Seville is the production of Nature, ordained to be what it is by the wisdom of the Creator, but man, who originated grafting blames the *tree* in ignorance, by failing to realise that he by grafting perverts the courses of Nature, and sets up a disconnected unnatural substitution which cannot thrive until more of the simplest of her laws shall be better comprehended.

With regard to stock behaviour in South Africa, it is the same as stock behaviour in any other part of the world enjoying equal citrus advantages. There can be no difference.

One may ask: What *stock* is most likely to yield the best result with me?

The answer under the "Masters System" is simple, namely: The indigenous seedling tree, which, growing upon its own root, shall attain the largest standard, with freedom from disease, carrying the best fruit with the greatest regularity under all conditions; and which, as a seedling tree, has proved most profitable with the grower.

As a resistant stock, the orange that most nearly complies with these requirements, namely, the Seville at specialisation.

To return, then, to the proofs I have to offer, shewing that growth *can* be made with *any scion* on the Seville stock, I can only repeat the same statements as made with the lemon and pamplemous experiments, but seeing the Seville cannot be classed as a first union stock at all it may be necessary to explain further.

At the time I saw the results of second union lemon fruit, I had in my nursery but 500 three-year-old Seville stocks grown from imported seed and about 80 grown from Colonial (Natal) seed of about two years old.

---

* **Rains develop stock-influence and soil-factors to an enormous degree. Sensibly retarding or ripening in accordance with the various factors concerned.**

I knew now that specialisation as exhibited in the old groves throughout the world was the outcome of many years of constant unionising.*

I further realised that specialisation could be as truly and as permanently established in a few months with citrus (and some two years in deciduous) if identical lines were laid down for the specific object of accomplishing such specialisation to meet the exigence of growth, unity and fruit, in view of which nothing but *the best scion to commence with* could possibly give the best result.

Now, on the whole of my farm I had no scion of sufficient merit to commence with. I knew no one in this country that had a scion under a "pedigree" name that equalled the ordinary high-grade Cape seedling orange.

Compound mongrelisation was in every scion in the country that I knew of, therefore, I realised it would be folly for me to bud hundreds or thousands of Sevilles with inferior fruit because I would not plant them out myself. If I propagated them to sell to people who relied on my honesty, I knew I could never look Mr. Masters in the face again. Thus, to-day I have thousands of Sevilles waiting for the necessary scions to work them, knowing that anything I could put on them would be inferior to the Cape seedlings.

A few experiments I conducted as follows, to prove my case, as a theory is nothing but a theory until actual practical results substantiate it.

The first experiment was to specialise a spice tangerine (known to be highly refractory with a Seville stock). I had one† which had failed to make a growth of six inches above its stock during the four years which had elapsed since I purchased it, being thus some seven years old from seed, about ten inches high, and had responded neither to copious rains, careful attention, nor good soil.

I cut off two attenuated twigs, making six short, tiny grafts, and grafted them on to six three-year-old Seville stocks.

In one year they had grown into dense bushy trees, having fully twenty radiations, and averaging for the year's growth some fifteen inches or more. They bore a few stray fruits the second year, and some six to twelve per tree the year following.

The fruit *all ripened together*, which, with its dense short bushy habit and the flavour of the fruit, indicated mongrelisation was of the simple order, and that the scions (which were on the trees when I purchased them) had been taken from a seedling tree, making a first union to the Seville stock. The fruit was good, even if rather small, of excellent appearance, uniform size, thinner peel than the lemon, but tighter, and free from blemishes.

---

* Every Orange-growing community throughout the world raise their own trees by a connected, definite, continuous system, the same scion on the same stock, over and over again. They point to a result and say that *this* tree was produced from a scion taken from *that* tree and grafted on to such and such a stock, and as their knowledge forms a record it is always followed with success. They seldom attempt a deviation seeing the deviations are not successful. Thus specialisation is definitely secured without them realising that specialisation ever exists.

† One of several.

The third union made from these seconds outgrew the control stock sprout when placed fifteen inches above the ground, and, of course, will make *wood* for some years to come.

The next experiment consisted of training Washington Navels on to the Seville, which many growers realise *will not thrive on the Seville stock.*

I had one tree (the sole survivor but one of many Washington Navels on Seville which had died, or been dug out as worthless), which "grew," or I should say which was still alive, on a Seville stock. It was a dwarf, refusing to make wood, but was a mass of blossom every year. Its fruit was small and poor quality, its branches weak, a typical specimen as illustrating why the Seville stock has been condemned.

I made twelve grafts on to twelve Seville stocks, ten of which "took."

They grew very much better than I anticipated, but within two years the growth stopped, and the usual abnormal fruiting developed. Knowing the trees were worthless for planting out, I allowed them to grow or do as they pleased.

Their second union growth was nearly equal for the first two years to the first union growth made by the lemon under equal conditions, but superior to second union growth on pamplemous.

In each case I allowed *two* scion sprouts to grow on every stock; one to be used for making third unions, and the other to shew what the results would be, both as regards growth, fruit, or what not.

The fruit borne at the end of the second year on these second unions to the Seville stock was the first actual tangible evidence I had had that compound mongrelisation was a real and positive substance.

Hitherto, in endeavouring to account for peculiarities exhibited in the fruit of many older trees which *the stock* upon which it was then growing did not furnish a sufficiently reasonable hypothesis to rely on; I had crystallised no conclusive theory whatever.

Knowing, however, from past investigations that there are no "freaks" in the undeviating law of nature, but that every peculiarity is a definite concordance, the issue of some fundamental truth not co-related by horticultural science, the occurrences had seemed most difficult of analysis.

The fruit of these second unions, together with the experience I had acquired with regard to the flavours, or other peculiarities which are transmitted to the fruits by the stocks on which they are grafted, convinced me that what I now term "compound mongrelisation" would justifiably account in every instance for all that seemed inexplicable in the past.

If one has studied the preceding pages with the view of learning, he must admit that there are reasonable and conclusive grounds for the inclusion of the word "mongrelisation" in the vocabulary of scientific horticulture.

The second union trees here mentioned all blossomed at the same time, and all the fruit set at the same time.

They were never irrigated after the fruit had set, as the ground was moist from rains and did not need it. The trees were all growing under equal conditions, and the different growths were simply attributable to different forces in the grafts, as has been explained fully elsewhere.

The fruit that ripened *first* had the true orange flavour, and were of average size. The fruit that ripened soon afterwards would never have proved "compound mongrelisation," but those that ripened last, or rather, I should say, those that would not colour up at all or sweeten, were those from which the first step in the theory of stock influences being retransmissible was evolved.

As an instance of how easy it is to fail to rightly apply knowledge gained, I have to confess that I never gave a thought to the *lemon stock*, which probably carried the scion wherewith the tree was grafted which I purchased, and from which I cut the scions to make these second unions.

It was not until I picked some of these fruits to make them colour up that I noticed the exact features in their behaviour as manifested by "lemon unions."

I have to confess, further, that when I first tasted these fruits that would not colour up I remarked: "One would think they had been grown on a lemon stock," never thinking how true the remark was.

The fruits that "ripened" last were, equally with those that ripened first, exposed to as much sun the one as the other.

Seedling oranges that ripen last are "shade" fruit, or are retarded by the absence of seasonable rains. Here there was no shade at all, and ample soft ripening rains for months.

The first indication of the influence of the lemon stock is to delay ripening,[†] the next feature being the sensible, peculiar acidulous flavour attributable to nothing but stock.

Both these peculiarities were distinct.

From whence then did they originate if not from previous stock? From accident or "freaks?"

However, as the matter was to me of the greatest importance, and knowing from whence I purchased the trees, I was guilty of a back-door enquiry to get at the actual truth, and I found, sure enough, that the scions had been taken from a lemon stock to bud the extra-

---

[*] Washington Navels on Seville Stock.

[†] See "The Lemon Stock," Chapter X.

large stocks I had purchased by paying an enhanced price for the same.

However this may be, whether true or not, I will not adduce it as proof, but it furnished the clue, and if I may be allowed another digression I will prove it from my own personal knowledge.

In 1896 there was a very fine orange tree on this farm,* about twelve years old. It was thought to be a "seedling" with the bottom branches cut off. The man I had managing the farm said it was the sweetest and best flavoured orange he had ever tasted. When I saw it, there was none ripe. A month or more later I tasted it for the first time, and although it was a superb looking orange the flavour, to my mind, was distinctly inferior.

I told him so, and gave him one to "try," and he had to admit, with a bad grace, that they did not seem so good now as then.

He thought it was the season!

Four years later the *Orange* died from drought (and wounds made by children's feet) exposing the lemon stock, which is still alive.

I have growing in my experimental orchard six or more trees which were cleft-grafted with large branches from this tree on to two-year-old lemon stocks.

The growth and general contour of these trees cannot be improved upon, but the same peculiarity again manifests itself, namely, that the *first* fruits that ripen, although smaller than those that ripen later, are very sweet, with a delicious flavour, whilst those that ripen later in consecutive order are, as a comparison, "lemony," "lemonier," "lemoniest." Distinct and unmistakable.

I can shew many hundred of similar instances, but cannot prove *their past history;* nevertheless, it goes to shew that simple and compound mongrelisation is irregularly distributed over the tree as much as from past as present stock, and is an absolute tangible irrefutable fact.

Now, if in the face of these indisputable proofs it shall be conceded that the use of dissimilar or low-class stocks does sensibly depreciate the excellence of the fruit, it seems a most reasonable conclusion that the highest grades of fruit which are positively known to exist under various names and types throughout the world, cannot enjoy their universal reputation, nor their admitted merit if treated in the derogatory manner pursued by South African propagators.

They are guaranteed true to *name*, but the name is a counterfeit.

With regard to second, third or fourth unions with the Washington Navel on Seville stock, which as yet has not been mentioned, it seems almost superfluous to go into details again, seeing that the description which deals with the various "unions" on the lemon, stock coincides in every detail with the behaviour of the Seville if one also takes into consideration the unsuitability of "lemon" soil to grow "Sevilles" in.

---

* **Coomb's Forest, Dist. Bathurst.**

If the Seville could be planted in such soil, and could enjoy as perfect freedom in its site as that enjoyed by the lemon in the open dry soils usually met with in our orchards in which it flourishes so well, I think it would make as good a "first union" stock as the lemon has proved itself to be. Thus, the discrepancy between the two stocks may be said to lie in soil inadaptation aggravated by the inadequacy of "first union" grafting.

As concerns the Navel type, the Seville and the seedling orange are the only stocks I know that will yield most regularly the true distinctive attraction of the smaller orange inside the apex of the larger one.

Second union lemon stocks are in this respect often worse than first unions. I have often seen on one tree, on the same twig, three Navel oranges, one having an immense umbilicus on the apex: another with a large displeasing protuberance quite outside the orange altogether: and the other with nothing whatever to shew it belongs to the Navel type.

If, then, merit exists in this type of orange, and the Seville, and the sweet seedling orange are the only stocks capable of delineating this meritorious qualification; moreover, if growth *can* be made by scions grafted on to specialised Seville in this country, surely the Seville stock has been prematurely condemned, and in ignorance?

The growth of the Seville stock does not equal the growth of the lemon stock under all or identical conditions for many reasons. The lemon and Seville have entirely different root formations, which probably is the work of a century or more. The lemon prefers a more open soil than the Seville,* and will thrive on less moisture than the Seville, but if the latter is planted on moist, compact ground, it will equal the growth of the lemon, provided the moisture is continuous and not intermittent.

The Seville will recover after as great a drought as the lemon or the seedling orange, but only responds to copious rains, whereas the two latter readily respond to surface rains owing to their mixed or "droughty" root formation (probably, as said above, the acquisition of centuries of climatological training).

I make no claim to improve upon nature because my system *is* nature, but, as shewn elsewhere, the Seville can, by training, be made to acquire a root more in conformity with the requirements of a "droughty" country; nevertheless, any growth factors embodied in my training system are necessarily limited to the natural conditions of the seedling stock.

---

* In the same way, the Seville prefers a more open soil than the pamplemous

In an open, dry, rich loam, the lemon will grow two feet to the Seville's *one* foot. The lemon or seedling orange are not root-rot proof, *but the Seville* is.

In open, dry loams, a *Seville* is not needed, but in the compact moist loams, or even sands, where root-rot seems always threatening, is just where the Seville, with its resistancy, does best.

I ask any reasonable, unbiassed grower if such is not the true compensation of nature?

Where a Seville thrives best is the very place where it is dangerous to plant anything that is non-resistant.

The fact speaks for itself, but the South African feature demands a passing word.

Everyone knows that South Africa is a country of meteorological extremes—died up or washed away, too little or too ample moisture, year after year.

Irrigated orchards, therefore, suffer most from the heavy, saturating rains falling on ground already moistened, hence only exceptionally porous and quickly-draining soils escape the ravages of root-rot.

Now, if this opinion coincides with that of the reader, it follows that suitable sites for orchards necessarily become limited unless remedial measures can be secured to the future grower.

There is only one remedial measure, and that is *dividends*, the outcome of *knowledge*.

Mechanical or financial measures are impractical, as estimated by land values and present markets, as well as by the large returns demanded on such investments in this country; but once again the specialised Seville stock previously prepared paves the way for sound investment *by exportation* of high-grade fruit.

What is needed above all else in citrus or fruit culture generally is the *security of absolute permanence* which shall permit of all things being *well* done, and for the best.

An *assurance of confidence* that shall predetermine that all things must be *wisely* done can, I greatly fear, only be gained through the workings of the personal experience of each individual grower; but it is, however, utterly impossible to suppose that such disassociated working can establish intelligent connected authenticated records of sufficient comprehensiveness to sway the products of a Colony or a Dominion. It seems a matter for the South African Governments collectively.

As long as a certain named grafted tree, irrespective of its birth or raising, is sold at a certain size for so much money, and the lowness of the price decides the planter in purchasing, so long will citrus culture remain a speculative investment. Moreover, so long as each unit works his own will and in his own way, keeping his ideas for his own benefit, so long must his own country remain outside the light of broader knowledge, and horticulture languish.

The best results in fruit production cannot materialise until definite finality shall adequately fill the many unrealised blanks occurring in the propagating methods of to-day.

The "Masters System" is, *actually, knowledge available to as many as shall believe it*, and not in citrus alone, but probably throughout the whole vast ramifications of universal fruit production; nevertheless, I am aware that "words" are but feeble instruments to convince those who have tried the Seville stock, that it is not the *stock* at fault so much as the way the stock has been misunderstood by soils, as well as by methods.

In concluding this chapter on the Seville, I may add that the Seville will make equal growth with the lemon provided the same soil advantages its uncultured root-system demands are given to it as to that of the lemon in the more general dryer class of soil in which the latter shews with us to better advantage.

It has been shewn that rain and soil factors which develop the whole amplitude of stock influence must exert a favourable influence on the fruit of the scion specialised above it. The growth of this scion will exceed that of all other resistant citrus stocks *capable of such specialisation*, and will equal the vigour of the lemon at its best.

Mr. Lounsbury, the Government Entomologist of the Cape Colony, who visited Brazil to find a parasite for the fruit fly, informs me that in Brazil he was informed they use two kinds of Seville for stocks; one named "laranga tanga," which, whilst giving a larger percentage of grafting failures, imparts especial size and flavour to the fruit; and the other, designated "laranga de terre," is easier grafted, and produces fruit inferior to the former.

The reasons for this have been fully explained elsewhere, and the grafting failures caused by the thin "bark," always indicative of "grade" or "quality," will be found under "The Science and Practice of Grafting" in the following Chapter, XIII.

(*To be Continued.*)

THE FARMERS' CONGRESS.

Minutes of the Proceedings of the Annual Meeting of the Central Association, held at Oudtshoorn, beginning Tuesday, the 12th day of March, 1907.

(*Continued from page* 544.)

AFTERNOON SITTING.

Congress resumed at 2.30.

DUTCH.

Mr. Verster (Cradock) raised the question of speaking in Dutch.

The President ruled that members can speak in Dutch, but appealed to those who can do so to speak in English to facilitate business.

AGENDA PAPER IN ENGLISH AND DUTCH.

Mr. Edmeades (Oudtshoorn) moved "That the Agenda Paper be printed in English and Dutch." Seconded by Mr. Lee (Zwart Ruggens), and agreed to.

THE ATTORNEY-GENERAL AND OSTRICH FEATHER THEFTS.

Mr. Douglass (Koonap Heights) moved "That this Congress elect degelates to meet Mr. Sampson *re* the proposed Ostrich Feathers Thefts Bill, on the 3rd April, at Grahamstown." Seconded by Mr. Heynes (George).

Mr. Lee (Zwart Ruggens) moved, as a rider, "That the places suggested by Mr. Sampson for meetings, *viz.,* Grahamstown, Oudtshoorn and Graaff-Reinet, are very suitable, and Congress strongly recommends that Somerset East be added."

Mr. Pietersen (Somerset East) moved, as an amendment, "to omit the word 'Grahamstown' and insert 'Somerset East.' "

On a vote being taken, the motion was agreed to, Mr. Pietersen's amendment thus lapsing, Mr. Lee's rider was agreed to, and the motion, as amended, was agreed to.

Mr. Pietersen (Somerset East) moved "That the deputation consist of ten members." Agreed to.

Mr. Lee (Zwart Ruggens) moved "That the election of the deputation be deferred till to-morrow morning with precedence." Agreed to.

All Roads to be Repaired.

Mr. Waldeck (Colesberg) moved "That in the opinion of Congress the Divisional Councils Act should be so amended that in all districts traversed by railway:—(1) No roads shall be deemed main roads; (2) that all roads shall receive attention; (3) that Divisional Councils be no longer held liable for damages sustained by travellers on any roads. That the foregoing amendments are necessary:—(a) Because of the increased traffic on unproclaimed roads to stations, sidings, etc.; (b) because in many districts main roads are not the most travelled roads; (c) to give justice to ratepayers who use any unproclaimed roads."

Seconded by Mr. Van Niekerk (Uitenhage).

Mr. Sills (Wodehouse) moved, as an amendment, "To omit Clause 3.

Mr. Currie (Upper Albany) moved, as a further amendment, "To omit Clause 2."

Mr. Dell (King William's Town) moved, as a further amendment, "To insert the word 'public' before the word 'roads' in Clause 2."

Mr. Moffat (Tarka) moved, as a further amendment, "That Congress re-affirms the resolution passed by previous Congresses, *viz.*, 'That all main roads and mountain passes be taken over and maintained by Government.' "

Mr. Lanham (Langberg) moved, as a rider, "That whereas at present the landowner is taxed by road rates for the upkeep of roads, bijwoners and natives, who are the principal people to use them, contribute nothing towards their maintenance; Congress, therefore, requests that a tax of 2s. 6d. per wheel, per annum, be placed on all vehicles, excepting those owned by *bona fide* landowners, in such districts as it may be deemed necessary to do so."

On a vote being taken, Mr. Dell's amendment was agreed to, Mr. Currie's and Mr. Sills's amendments were agreed to, the motion, as amended, was negatived, and Mr. Moffat's motion was also negatived, Mr. Lanham's rider lapsing.

The President, at this stage, introduced Dr. E. Nobbs, who had just arrived, and welcomed him. Dr. Nobbs acknowledged the introduction, and conveyed Dr. Hutcheon's regrets for inability to attend Congress.

Destruction of Jackals.

Mr. [illegible], M.L.C. (Uitenhage) asked that the resolution *re* destruction of jackals may be taken forthwith.

No objection was made by the members in charge of the motions on the Paper having precedence, and leave was granted.

Mr. H. A. Murray (Zwart Ruggens) moved "That in the opinion of Congress the withdrawal of rewards for the destruction of vermin will lead to a large increase in the loss of small stock by carnivora; Congress, therefore, urges upon Government the necessity of such payments, and is prepared to support a Bill compelling Divisional Councils to pay rewards for the destruction of vermin at a rate to be fixed by Government. Further, Congress urges upon Government the extreme importance of entering into communication with neighbouring States, with a view to obtaining uniform action in this matter."

Seconded by Mr. Moffat (Tarka).

Mr. G. Gardner (Upper Albany) moved, as an amendment, "That in the opinion of Congress the present system of rewarding farmers for the destruction of jackals be abolished and, in place thereof, wire netting and other material used in the erection of jackal-proof fencing be carried free on the railways."

Mr. C. G. Lee (Zwart Ruggens) moved, as a rider, "And that this Congress is further of opinion that jackal-proof fencing is beneficial in the highest degree for the country, and should be encouraged in every possible way by cheap railage and loans."

Congress adjourned at 6 o'clock.

Evening Sitting.

Congress resumed at 8 o'clock.

New Motion.

Mr. Goosen (Mafeking) asked leave to introduce a motion dealing with the Agricultural Credit System.

Ten members rose in support, and a vote was taken; and two-thirds of the delegates voting in favour, leave was granted.

Mr. Goosen thereupon moved that the following be placed on the Agenda Paper: "That the Agricultural Credit System for the Cape Colony, as propounded by the Treasurer of the Colony, be fully discussed."

Destruction of Jackals.

The debate on this subject was resumed.

Mr. Hurndall (Zwart Ruggens) moved, as an amendment to the original motion, "To insert, after the word 'necessity,' the words 'immediate resumption of.'"

On a vote being taken, Mr. Hurndall's amendment was agreed to, the first portion of the motion was agreed to, the second portion was negatived, the third portion was agreed to, Mr. Lee's rider was agreed to, and the motion, as amended, was agreed to as follows: "That in the opinion of Congress the withdrawal of rewards for the destruction of vermin will lead to a large increase in the destruction of small stock by carnivora. Congress, therefore, urges upon Government the necessity for the immediate resumption of such payment; and, further, Congress urges upon Government the extreme importance of entering into communication with neighbouring States with a view to obtaining uniform action in the matter. And this Congress is further of opinion that jackal-proof fencing is beneficial in the highest degree for the country, and should be encouraged in every possible way by cheap railage and loans."

Fencing Roads in the Transkei.

Mr. Laing (Xalanga) moved "That where an owner of a farm in the Transkei, over which a public road passes, wishes to fence such road, the Government, when called upon, shall pay half cost of fencing same." Seconded by Mr. Sills (Wodehouse), and agreed to.

Location Act.

Mr. Douglass (Koonap Heights) moved "That Congress enquire if the Government intend taking action on their Select Committee's report of last session *re* the working of the Location Act." Seconded by Mr. Gardner (Upper Albany), and agreed to.

Registration of Stock in Government Locations.

Mr. Collins, M.L.A. (Victoria East) moved "That an additional Act be introduced compelling registration of all stock in Government Native Locations by Headmen and Location Inspectors, they to note any change of ownership, and, before any stock can be disposed of, the owners must obtain certificates from them; such Headmen and Location Inspectors to be held responsible for any loss that may occur to any third party through the issue of certificates to any but *bona fide* owners." Seconded by Mr. Odendaal (Victoria East).

Colonel Robinson, commanding the Cape Police, addressed Congress on the matter.

General Sir E. Y. Brabant (East London) moved, as an amendment, "That Government be requested to enforce the provisions of Act 37 of 1884, with reference to registration of all stock in Government Native Locations."

Mr. McDonald (Whittlesea) moved, as a rider to the amendment, "And that all stock entering such locations shall be accompanied by an approved certificate."

On a vote being taken, the original motion was negatived, the rider was negatived, and General Brabant's amendment was agreed to.

Restrictions on Purchase of Land by Natives.

Mr. Dell (King William's Town) moved "That this Association, in view of the great influx of natives into portions of the Colony, would strongly urge upon Government the adoption of the resolution framed by the Native Affairs Commission, *viz.*:—That certain restrictions upon the purchase of land by natives are necessary, and recommends: (1) That purchase by natives should in future be limited to certain areas to be defined by legislative enactments. (2) That purchase of land which may lead to tribal, common, or collective possession or occupation by natives should not be permitted. That whatever principles govern the settlement of the question of the purchase of land by natives should apply equally to the leasing of land by natives." Seconded by General Sir E. Y. Brabant, M.L.A. (East London).

Mr. Lee (Zwart Ruggens) moved, as an amendment, "To insert the word 'aboriginal' before the word 'natives,' where that word occurs in the motion."

On a vote being taken, the amendment was agreed to, and the motion, as amended, was agreed to.

Tax on Unoccupied Farms.

Mr. H. White (Phokwani) moved "That Congress is of opinion that a tax of at least 5 per cent. on the Divisional Council valuation be levied on all unoccupied farms in the Colony." Seconded by Mr. Goosen (Mafeking).

Mr. T. Lanham (Langberg) moved, as a rider, "Excepting where the owner cannot procure water, to discover which a reasonable time shall be allowed."

The rider was withdrawn with the leave of Congress.

On a vote being taken, the motion was agreed to.

Mr. Francis (Molteno) moved "That Congress now adjourn." Seconded by Mr. Adams (Kimberley), and agreed to.

Congress adjourned at 11 o'clock.

WEDNESDAY, MARCH 13, 1907.

MORNING SITTING.

Congress resumed at 9 o'clock.

Minutes of previous day's sittings read and confirmed.

New Cattle Disease.

Mr. Adams (Griqualand West, Kimberley) asked leave to move, as a matter of urgency, an unopposed motion dealing with a new cattle disease. Leave being granted, Mr. Adams moved "That in the opinion of Congress the early publication of an official statement from the Veterinary Department of the cause, effect and probable development of the new disease amongst cattle now prevalent north of the Orange River will be most beneficial in forewarning and forearming cattle owners." Seconded by Mr. Heynes (George), and agreed to.

SECRETARY'S REPORT.

Mr. Francis (Molteno) moved "That the secretary's report be adopted." Seconded by Mr. Van Niekerk (Uitenhage), and agreed to.

DEPUTATION *re* OSTRICH FEATHER THEFTS.

Mr. Lee (Zwart Ruggens) moved "That the deputation to wait upon the Attorney-General consist of the following: Messrs. P. Weyer, H. Abrahamson, O. E. G. Evans, H. Collins, M.L.A., R. F. Hurndall, M.L.C., A. Douglass, S. Smith, J. M. Gush, C. Currie, and C. Gardner, who is the Convenor." Seconded by Mr. Francis (Molteno), and agreed to.

NATURE STUDY.

Mr. Lee (Zwart Ruggens) moved "That Congress strongly recommends Government to consider the introduction of Nature Studies in the schools and colleges as a part of their endeavour to encourage higher and more technical agricultural education." Seconded by Mr. Looch (Willowmore).

Mr. Heynes (George) moved, as a rider, "That the educational training for young farmers at school should include analytical chemistry, book-keeping, and such other subjects which may be of service to them in that profession."

Mr. Heynes (George) withdrew his motion with the leave of Congress.

Dr. E. Nobbs, Agricultural Assistant, addressed Congress on this subject.

On a vote being taken, the motion was agreed to unanimously.

GOOD WISHES FROM NATAL.

The President read the following telegram from the Natal Agricultural Union: "Best wishes. Trust you will have a profitable meeting."

ANALYTICAL CHEMISTRY.

Mr. Heynes (George) moved "That the educational training for young farmers at school shall include Analytical Chemistry, Book-keeping, and such other subjects which may be of service to them in that profession." Seconded by Mr. Robertson (George).

Mr. Joubert (Lady Grey) moved, as an amendment, "To omit the word 'analytical.'"

Mr. Hall (Bedford) moved, as an amendment, "To omit the words 'Analytical Chemistry, Book-keeping and such other,' and insert 'Elementary Agricultural Chemistry, Book-keeping and kindred subjects.'"

On a vote being taken, both amendments were agreed to, and the motion, as amended, was agreed to, as follows: "That the educational training for young farmers at school should include Elementary Agricultural Chemistry, Book-keeping and such kindred subjects as may be of service to them in the profession."

EDUCATION TO BE PAID OUT OF GENERAL REVENUE.

Mr. Van Niekerk (Uitenhage) moved "That the School Board Act be so amended that any deficiency of income shall be met out of the general revenue of the Colony, and that no special tax shall be levied by the Divisional Council in order to meet this deficiency." Seconded by Mr. Hurndall, M.L.C. (Uitenhage).

Mr. Francis (Molteno) moved, as an amendment, "To insert the words 'or Municipal Council,' after 'Divisional Council.'"

Mr. Douglass (Koonap Heights) moved "the previous question."

On a vote being taken, the previous question was agreed to, and on the question being put, Mr. Francis's amendment was agreed to, and the motion, as amended, was negatived.

FARM SCHOOLS, NOT UNDER BOARDS, TO BE INSPECTED.

Mr. Dell (King William's Town) moved "That it is desirable that a new class of schools be created under the Education Act, in which private farm schools not entirely taken over by the local School Board should, nevertheless, be entitled to the privilege of having their children inspected, if they wish, by the Government Inspector, either at the school or at some convenient centre appointed by the Board." Seconded by Mr. Flanagan (Komgha).

Mr. Francis (Molteno) moved, as an amendment, "to omit the word 'entirely.'"

Mr. Hall (Bedford) moved, as a further amendment, "to omit the words 'a new class of school be created under the Education Act, in which.'"

Mr. Edmonds (Komgha) moved, as a further amendment, "That where parents having private schools on farms ask for Government inspection, it be granted where convenient."

Mr. A. H. Murray (Zwart Ruggens) moved, as a further amendment, "That in the opinion of Congress it is in the interests of education that inspectors endeavour, when requested, to inspect schools on farms which, owing to the paucity of numbers, or refusal of Board, do not fall under the School Board Act."

On a vote being taken, Mr. Francis's amendment was agreed to, Mr. Hall's amendment was agreed to, and the motion, as amended, was agreed to (the other amendments lapsing), as follows: "That it is desirable that private farm schools not taken over by the local School Board should, nevertheless, be entitled to the privilege of having their children inspected, if they wish, by the Government Inspector, either at the school or at some convenient centre appointed by the Board."

Raising Age for Going to School.

Mr. Gilfillan (Midlands) moved "That this Congress is of opinion that the general tone and welfare of the country would be better served if the ages of children for compulsory education were raised from six years to eight years." Seconded by Mr. Van Niekerk (Uitenhage), and negatived.

Reply from Attorney-General.

The secretary read the following telegram from the Attorney-General, in reply to one covering the resolution *re* Ostrich Feathers Thefts Bill: "Possibly meeting at Grahamstown will be sufficient, but will judge of that when the time comes."

Congress adjourned at 12.45 p.m.

AFTERNOON SITTING.

Congress resumed at 2.15 p.m.

Unopposed Motion.

Mr. Lanham (Langberg) asked leave to move an unopposed motion asking for a poll-tax to provide revenue for administering the Education Act. A member opposing, leave was not granted.

Wild Dogs.

Mr. Lanham (Langberg) moved "That this Congress is of opinion that Government should include wild dogs in the list of vermin, for the destruction of which rewards are granted." Seconded by Mr. Aucamp (Griqualand West, Kimberley), and agreed to.

Jackal Fences to be under old Fencing Act.

Mr. Moffat (Tarka) moved "That jackal-proof fencing come under the operation of the present Fencing Act, and barbed wire fencing be legalised." Seconded by Mr. Waldeck (Colesberg).

Mr. Dell (King William's Town) moved, as an amendment, "That the Fencing Act be so amended that jackal fencing come under the meaning of the Act, except in so far that instead of applying to the whole Division, it may apply to one or more wards, such enforcement to be determined by a majority of two-thirds of the landowners in the said area; further, that barbed wire be legalised along main and public roads.''

Mr. Lee (Zwart Ruggens) moved, as a further amendment, ''to omit the words 'and barbed wire fencing be legalised.' ''

Mr. Collins, M.L.A. (Victoria East) moved, as a further amendment, ''to reaffirm the resolution passed at last Congress, *viz.*, 'That the Jackal Fencing Act be amended so that any person having the beneficial use of jackal fencing shall be liable for half-share of the cost of such fence. In the event of any dispute arising, such beneficial use to be decided by arbitration.' ''

Mr. A. H. Murray (Zwart Ruggens) moved, as a further amendment, ''That jackal-proof fencing come under the operation of the present Fencing Act, so that neighbours pay half the cost of jackal-proof fencing in every case where it is constructed.''

Mr. Hall (Bedford) moved, as a further amendment, ''to insert, after the word 'Act,' the words '30 of 1883.' ''

Mr. Evans (Bedford) moved, as a further amendment, ''That jackal-proof fencing come under the operation of the present Fencing Act in such districts where the majority of the Divisional Council agree to such provision.''

Mr. Dell withdrew his motion with the leave of Congress.

On a vote being taken, Mr. Hall's amendment was agreed to, Mr. Lee's amendment was negatived, Mr. Moffat's motion, as amended, was negatived.

Mr. A. H. Murray (Zwart Ruggens) called for a division, which resulted as follows:—

Ayes: Hall, Weir, Flanagan, Edmonds, Maclachlan, Heynes, Sills, Flynn, Gardner, Laing, Collett, Moffat, Frost, Gilfillan, Weyer, Bowker, Murray, Pietersen, Roberts, Hurndall, and Christian—21.

Noes: Francis, Rehbok, Joubert, Brabant, Collins, Lanham, Aucamp, Gunning, Goosen, Smith, Dell, Evans, Waldeck, Robertson, De Villiers, Currie, Mulder, Douglass, Looch, Edmeades, Baker, Schoeman, McDonald, Cumming, Van Niekerk, Abrahamson, Lee—27.

The motion was, therefore, negatived.

Mr. Murray and Mr. Collins withdrew their amendments with the leave of Congress.

Mr. Evans's amendment was agreed to.

Mr. Hall called for a division, which resulted as follows:—

Ayes: Francis, Rehbok, Joubert, Weir, Dell, Flanagan, Lanham, Edmonds, Smith, Evans, Waldeck, Heynes, Robertson, Currie, Edmeades, Mulder, Douglass, Sills, Looch, Baker, Van Niekerk, McDonald, Cumming, and Lee—24.

Noes: Hall, Brabant, Collins, Maclachlan, De Jager, Gardner, Schoeman, Goosen, Flynn, Collett, Christian, Frost, Moffat, Gilfillan, Bowker, Weyer, Abrahamson, Pietersen, Murray, Roberts, Hurndall, and Hockly—22.

The motion was, therefore, agreed to, as follows: "That jackal fencing come under the operations of the Fencing Act in such districts where the majority of the Divisional Council agree to such provision."

LOANS FOR FENCING.

Mr. Cumming (Albert) moved "That in the opinion of Congress loans for jackal-proof fencing should not be restricted to syndicates of five, but should be given to individual farmers on their providing satisfactory security." Seconded by Mr. Frost (Tarka), and agreed to.

LOANS FOR IRRIGATION.

Mr. Baker (Willowmore) moved: "Congress respectfully urges upon Government that with a view to encourage irrigation by farmers under the Loans Act, it be enacted that: (a) Provided ample security for the due repayment of the loan is offered and obtained; (b) Provided that cognisance is given and obtained, that the loan is being used entirely and solely for irrigation purposes: (1) That the Government resign to the farmer the right to decide on the feasibility and profitableness of the scheme, how to construct and carry it out, and when." Seconded by Mr. Weyer (Somerset East).

Mr. Abrahamson (Somerset East) moved, as an amendment, "to omit the words 'and when' at the end of the resolution."

On a vote being taken, the amendment was agreed to, and the motion, as amended, was agreed to.

FLOOD WATER CONSERVATION.

Mr. Gunning (Griqualand West, Kimberley) moved: "This Congress strongly advocates the taking of measures for the conservation of the flood waters of all rivers in the Colony." Seconded by Mr. Evans, and agreed to.

DESTRUCTION OF LOCUSTS.

Mr. Joubert (Lady Grey) moved "That Congress urges upon Government the advisability of continuing their policy of co-operation with the neighbouring Colonies in their endeavour to deal with the locust plague, and the pressing need of taking similar steps towards an organised system of combating locusts, as are in effect and so successful in other Colonies in South Africa." Seconded by Mr. Francis (Molteno).

Congress adjourned at 6 o'clock.

EVENING SITTING.

Congress resumed at 8 o'clock.

More Delegates.

The secretary announced that the following had arrived by the afternoon train: Messrs. J. Arnold (Vice-President), T. Stephens (Cathcart), J. Field (Lower Cathcart), P. M. Southey (Venterstad), T. T. Oosthuisen (Steynsburg).

New Cattle Disease.

The secretary read the following telegram from the Director of Agriculture, in reply to a telegram sent by Congress this morning: "Your telegram to-day *re* new cattle disease north of the Orange River. From examinations made in Southern Rhodesia and the Transvaal, where it has invaded hundreds of herds and infected thousands of cattle, and from examinations of cases by our own veterinary officers, the disease is an acute ephemeral fever, lasting usually about three days, with little or no tendency to terminate fatally if the animal is kept quiet and comfortable, and not killed by injudicious treatment. A simple laxative is said to be beneficial if administered carefully. It is communicable by artificial inoculation, and is most probably spread by the bite of some flying insect which has fed on a sick animal, similar to the malarial catarrhal fever of sheep and horse sickness. I regret we cannot suggest at present stage any effective preventive measures that can be taken against its spread."

Destruction of Locusts.

The debate on this subject was resumed.

Mr. Flynn (Phokwani) moved, as an amendment, "That Congress is of opinion that our Government should approach the other Governments of all the South African Colonies and States with the object of framing uniform compulsory legislation for the destruction of locusts while in the hopper stage."

On a vote being taken, the motion was agreed to (the amendment, therefore, lapsing), "That Congress urges upon Government the advisability of continuing their policy of co-operation with the neighbouring Colonies in their endeavour to deal with the locust plague, and the pressing need of taking similar steps towards an organised system of combating locusts as are in effect and so successful in other Colonies in South Africa."

Exportation of Ostriches.

Mr. Edmeades (Oudtshoorn) moved "That Congress approach the Government with a view to legislative provision being made for prohibiting the exportation of ostriches and ostrich eggs over the boundaries of the British territories in South Africa." Seconded by Mr. Mulder (Oudtshoorn), and agreed to.

FEATHER LICENCES.

Mr. C. Gardner (Upper Albany) moved "That the indiscriminate issue of licences for the purchase of ostrich feathers directly through the post office on payment of £5 be discontinued. That all applications for licences under this Act be first submitted to a Board consisting of members of Divisional Councils for consideration. That only such licensed persons be allowed to purchase feathers; and that Section 3 of Act 32 of 1883 be so amended as to make it illegal for such buyers to employ unlicensed agents (*See* Queen *vs.* Botha)." Seconded by Mr. Evans (Bedford).

Mr. Pietersen (Somerset East) moved, as an amendment, "To petition Government to amend Act 32 of 1883 in such a way as to prohibit the dealing in ostrich feathers for the purpose of trade at other than some certain place or premises to be specified in the licence issued to such dealer or dealers. That records of buyers be kept in duplicate, one to be kept by the buyer, and one to be given to the seller, who shall forward this to the nearest police station, and the police be bound to examine the buyer's book once a month."

On a vote being taken, the motion was agreed to, and the amendment lapsed.

FEATHER REGISTER BY BUYERS.

Mr. A. Douglass (Koonap Heights) moved "That all feather buyers, except at auction sales, should keep a book with counterfoil, and fill in the same immediately a sale takes place, giving a signed copy to the seller, who should be compelled to keep it for some stated time; this counterfoil and copy to state exactly the weight of the different classes of feathers bought; and further that no person be allowed to sell feathers except when divided or sorted into these different classes." Seconded by Mr. Evans (Bedford).

Mr. Abrahamson (Somerset East) moved, as an amendment "to omit all words after the word 'bought.' "

On a vote being taken, the amendment was agreed to, and the motion, as amended, was agreed to as follows: "That all feather buyers, except at auction sales, should keep a book with counterfoil, and fill in the same immediately a sale takes place, giving a signed copy to the seller, who should be compelled to keep it for some stated time; this counterfoil and copy to state exactly the weight of the different classes of feathers bought."

PLUCKING SMALL FEATHERS.

Mr. Looch (Willowmore) moved: "Congress is of opinion that it is not desirable to pluck small and chick feathers from the ostrich." Seconded by Mr. Goosen (Mafeking).

The motion was withdrawn with the leave of Congress.

CO-OPERATION BETWEEN FARMING BODIES.

Mr. Edmeades (Oudtshoorn) moved "That this Congress proceeds to discuss the scheme laid before the Western Province Board of Horticulture by the Hon. C. W. H. Kohler for closer co-operation between the various bodies promoting farming interests in this Colony, with a view to arriving at some definite basis of such co-operation." Seconded by Mr. Mulder (Oudtshoorn).

Mr. J. Arnold (Vice-President) moved to postpone discussion till to-morrow morning, with precedence. Seconded by Mr. Maclachlan (Vryburg), and negatived.

The debate proceeded.

Mr. Lee (Zwart Ruggens) moved, as an amendment, "With a view to opening a way for the different agricultural organisations to enter into closer agreement with the object of forming a powerful combination to be utilised for mutual benefit, this Congress proposes: (a) That the Congresses of the Agricultural Union, the Fruit Growers' Association, and the Central Association each elect five representatives, who shall constitute a Board of Agriculture. It is advisable that the Government for the time being have representatives upon the Board, but such representation to have no political significance. (b) Objects of the Board: (1) To minimise the present overlapping of work; (2) To obviate, as far as possible, farmers coming to the Government with two distinct requests on the same subject; (3) To have in continuous active operation a strong Council, representing all agricultural interests, and operating under the ægis of the Government; (4) Always endeavouring to secure the aims of the organisations represented; (5) Also to take the responsibility of acting, if desired, as Advisory Board of Agriculture for the Government; (6) To create a medium through which all farmers' organisations may meet the neighbouring Colonies at the regular Inter-Colonial Agricultural Conference."

Mr. Edmeades (Oudtshoorn) moved "That the debate be adjourned till to-morrow morning, with precedence." Agreed to. The debate was, therefore, adjourned.

DISINFECTION OF TRUCKS.

Mr. Abrahamson (Somerset East) moved: "Whereas Scab is on the decrease, this meeting is of opinion that more stringent steps should be taken by Government to prevent re-infection, by removal of stock;

more especially so by rail, as the present method of disinfecting trucks is inadequate; this meeting is further of opinion that railway trucks and dog boxes should be thoroughly disinfected immediately upon the removal of stock by a strong solution of a recognised dip." Seconded by Mr. Pietersen (Somerset East).

At the request of Congress, Mr. Davison addressed the meeting on the question on the Paper, and on the Scab question generally.

On a vote being taken, the motion was agreed to.

Mr. Francis (Molteno) moved the adjournment, which was agreed to, and Congress adjourned at 11.15.

THURSDAY, MARCH 14, 1907.

MORNING SITTING.

Congress resumed at 9 o'clock.

Co-operation between Agricultural Bodies.

The debate on this subject was resumed.

Mr. Gardner (Upper Albany) moved "That this Congress considers it advisable that this matter stand over for consideration at next Congress."

Mr. Joubert (Lady Grey) moved, as a further amendment, "That this question of amalgamation with other bodies be left in abeyance; that the matter be referred to the different Branches for their decision; and that our Executive communicate with the Executives of those other bodies with a view to learn on what lines they would be willing to co-operate with us; and that this subject be brought on at next year's meeting of Congress."

Mr. Edmeades (Oudtshoorn) withdrew his motion with the leave of Congress.

On a vote being taken, Mr. Joubert's amendment was agreed to, and the matter, therefore, remains in abeyance till next year, the other amendments lapsing.

Publication of Scab-infected Farms.

Mr. Evans (Bedford) moved "That Congress, with a view to the protection of clean flocks, strongly urges that instructions should be issued for Assistant Inspectors of Sheep to furnish to the Resident Magistrates lists of farms on which are flocks infected with scab; and that the Magistrates of such districts shall publish these lists in their respective local newspapers at least every month." Seconded by Mr. Francis (Molteno), and agreed to.

REPORTING SCAB TO NEIGHBOURS.

Mr. C. Currie (Upper Albany) moved "That the following clause be inserted in the Scab Act: 'That immediately upon an outbreak of Scab in sheep on any farm, the farmer shall at once report same to his neighbours, under penalties provided by Act 28, Section 21, 1886.' " Seconded by Mr. Weyer (Somerset East), with the following rider: "And that the Inspector order such infected stock to be kept separate until proclaimed clean."

On a vote being taken, the rider was negatived, and the motion agreed to.

AMENDING SCAB ACT.

Mr. Gilfillan (Midlands) moved "That this Congress is of opinion that Section 21 of Act 30 of 1894 be so amended that an owner be obliged to at once report an outbreak of Scab to the Inspector, and, within seven days, to all adjoining landowners, and that a minimum penalty of £10 be imposed for any contravention of these rules. Further, that when Scab is found to exist in any area, to a greater extent than is warranted by the seasons experienced, the services of the Inspectors of such areas be dispensed with." Seconded by Mr. Weyer (Somerset East).

Mr. Roberts (Fort Beaufort) moved, as an amendment, "to omit the words 'and within seven days to all adjoining landowners.' "

Mr. Francis (Molteno) moved, as a further amendment, to omit all words after the word "rules."

On a vote being taken, Mr. Roberts's amendment was agreed to, Mr. Francis's amendment was agreed to, and the motion, as amended was agreed to, as follows: "That this Congress is of opinion that Section 21 of Act 30 of 1894 be so amended that an owner is obliged to at once report an outbreak of Scab to the Inspector, and that a minimum penalty of £10 be imposed for any contravention of these rules."

CONGRESS AND MAGISTRATES.

Mr. Hurndall, M.L.C. (Uitenhage) moved, as an unopposed motion, "This Congress is of opinion that if Magistrates would impose heavier penalties, to be doubled upon second conviction, of any persons for infringements of the Scab Acts, this would greatly assist Inspectors in cleansing their areas." Seconded by Mr. Arnold, and agreed to.

DIPPING TANKS.

Mr. Cumming (Albert) moved "That in the opinion of Congress every owner of a farm where sheep or goat farming is carried on, be compelled to have a dipping tank on his farm, and that no dipping on adjoining farms be allowed except under special conditions, and with the consent of the Inspector of the Ward." Seconded by Mr. Joubert (Lady Grey).

Mr. Waldeck (Colesberg) moved, as an amendment to insert the word "efficient" before the words "dipping tank."

Mr. Abrahamson (Somerset East) moved, as a further amendment, to omit all words after the word "allowed."

Mr. Lee (Zwart Ruggens) moved, as a further amendment to omit "Inspector of Ward" and insert the words "Assistant Inspector "

Mr. Gardner (Upper Albany) moved, as a further amendment, to add the words "where recommended by the Divisional Councils."

On a vote being taken, Mr. Waldeck's amendment was agreed to, Mr. Abrahamson's amendment was negatived, Mr. Lee's amendment was agreed to, Mr. Gardner's amendment was negatived, and the motion, as amended, was agreed to, as follows: "That in the opinion of Congress every owner of a farm where sheep or goat farming is carried on, be compelled to have an efficient dipping tank on his farm, and that no dipping on adjoining farms be allowed except under special conditions, and with the consent of the Assistant Inspector."

Unopposed Motions.

Mr. Goosen (Mafeking) asked leave to move an unopposed motion *re* tanks in native locations. A member objecting, leave was not granted.

Mr. Evans (Bedford) asked leave to move an unopposed motion *re* removal of inspectors to other areas in cases of dereliction of duty. A member objecting, leave was not granted.

Wool and Mohair Collected from the Veld.

Mr. Waldeck (Colesberg) moved "That Congress is of opinion that the collection and sale of wool and mohair off the veld be looked upon by law as a criminal offence." Seconded by Mr. Moffat (Tarka).

Mr. Flynn (Phokwani) moved, as an amendment, to insert the word "unauthorised" before "collection."

On a vote being taken, both amendment and motion were negatived.

South African Scab Act.

Mr. Cumming (Albert) moved "That in the opinion of Congress the time has arrived for the adoption of a uniform effective Scab Act throughout the whole of South Africa." Seconded by Mr. Joubert (Lady Grey).

Mr. Dell (King William's Town) moved, as an amendment, "That in the opinion of Congress the time has arrived for the adoption of a uniform effective Scab Act throughout the whole of South Africa, and, with this object in view, recommends that the Government approach the Governments of the various Colonies concerned that a uniform law may be framed. Congress further suggests that the present Scab Act in the Cape Colony be amended so as to provide that the first order to cleanse infected sheep shall be issued gratis. If, at the expiration of the first period allowed, scab is found to exist, the owner of the said sheep shall be granted a renewal of the order for a period not exceeding one month; and if the instructions given by the Inspector have not been carried out, a fine be imposed of not less than threepence for every sheep and goat in the flock; and for every subsequent renewal this fine be doubled. Furthr, that the removal of infected sheep, as allowed in parts 5, 8, 9, and 10 of Act 20, of 1894, be prohibited. And further, that the election of Scab Inspectors be left in the hands of the Government."

Mr. Goosen (Mafeking) moved, as a rider, "That dipping tanks be erected within a radius of fifteen miles from each other in the Native Reserves."

Congress adjourned at 12.45 p.m.

AFTERNOON SITTING.

Congress resumed at 2.15 o'clock.

AUDITORS' REPORT.

The Auditors' Report was read as follows: "Your Auditors beg to report that they have examined the vouchers of receipts and payments, and found the statement in the books correct, though the statement as printed contains two printer's errors. We wish to draw attention to the great saving that has been effected, and greater usefulness, which has resulted from the printing of proceedings of Congress in the *Agricultural Journal,* which should be continued. Your Auditors would draw attention to the excessive charge for printing agenda papers at Queen's Town compared to same services rendered at other centres in previous years. We wish, furthermore, to point out that the large amount of outstanding capitation fees leads us to suggest that Congress pass a regulation by which no delegate from any Branch shall take his seat until the fees for the previous year or years have been paid. The matter of bonus voted the secretary in 1905 at Somerset East also calls for the consideration of Congress."

Mr. Evans (Bedford) moved "That the Report be adopted." Seconded by Mr. Currie (Upper Albany).

Mr. Moffat (Tarka) moved "That the Report stand over till Saturday morning with precedence."

On a vote being taken, the amendment was agreed to, and the consideration of the Report stands over.

GREETINGS.

Mr. Rex conveyed to Congress the best wishes of the President of the Horticultural Board (Mr. Kohler), and for a successful Session.

SOUTH AFRICAN SCAB ACT.

The debate on this subject was resumed.

On a vote being taken, the original motion was agreed to, the amendment was negatived, the rider was agreed to, and the motion, as amended, was agreed to, as follows: "That in the opinion of Congress the time has arrived for the adoption of a uniform effective Scab Act throughout the whole of South Africa, and that dipping tanks be erected within a radius of fifteen miles from each other in the Native Reserves."

COMMITTEE FOR SECTIONAL DISCUSSION.

Mr. Murray (Zwart Ruggens) asked leave to move an unopposed motion, and leave being granted, moved "That a Committee of six members be appointed to consider the motion by Cradock *re* Sectional discussion." Seconded by Mr. Pietersen (Somerset East), and agreed to.

The following members were elected: Messrs. Hurndall, M.L.C., Moffat, Verster, Pietersen, Murray, and Adams.

ELECTION OF OFFICERS.

Mr. Adams (Griqualand West, Kimberley) asked leave to move an unopposed motion, and leave being granted, he moved "That the election of officers take place this evening at 8 o'clock." Seconded by Mr. Gunning (Griqualand West, Kimberley), and agreed to.

LIME FOR DIPPING PURPOSES.

Mr. Flanagan (Komgha) moved "That Government be requested to carry free over the Cape Colony all lime used for dipping purposes." Seconded by Mr. Laing, and agreed to.

DIPPING FOR TICKS.

Mr. Flanagan (Komgha) moved "That the time has now arrived when Government should make investigation with regard to the efficacy of dipping for ticks with a view to early legislation." Seconded by Mr. Heynes (George), and agreed to.

DIPPING FOR CERTAIN DISTRICTS.

Mr. Collins, M.L.A. (Victoria East) moved: "This Congress is of opinion that legislation is desirable for the eradication of ticks, and as a preliminary measure urges Government to introduce a Bill making the dipping of cattle compulsory in such districts as shall decide upon that course." Seconded by Mr. Hall, and agreed to.

CATTLE BY RAIL.

Mr. Adams (Griqualand West, Kimberley) moved "That in the opinion of the Central Association the compulsory cleaning of all cattle by dipping or spraying before transference from one district to another by rail, has now arrived." Seconded by Stephen Smith.

Mr. Gardner (Upper Albany) moved, as an amendment, to insert the words "road or" before "rail."

On a vote being taken, the amendment was negatived, and the motion was negatived.

Mr. Currie (Upper Albany) moved "That considering the disease called Lamziekte is causing such losses among cattle in the Albany District, Congress urges upon Government the necessity of investigating this disease in that district." Mr. C. Gardner (Upper Albany) seconded.

Mr. Flynn (Phokwani) moved, as an amendment, to omit the words "in that district."

On a vote being taken, the amendment was negatived, and the motion was agreed to.

MORE VETS. WANTED.

Mr. Aucamp (Griqualand West, Kimberley) moved: "Congress strongly urges upon Government the necessity for more resident Veterinary Surgeons." Seconded by Mr. Goosen (Mafeking).

Mr. Lee (Zwart Ruggens) moved, as an amendment: "In the Colony north of the Orange River."

On a vote being taken, the amendment was agreed to, and the motion, as amended, was agreed to.

NOTICE BOARDS *re* DISEASE.

Mr. Lanham (Langberg) moved "That this Congress is of opinion that when a farmer has been placed under quarantine on account of an outbreak of infectious disease amongst the stock on such farms, the owner or occupier be compelled to place a notice to this effect close to all main roads, where such roads intersect the boundaries of such farm, and that the Animal Diseases Act be amended to give effect to this resolution, and that the Magistrate supply the notices." Seconded by Mr. Francis (Molteno).

Mr. Abrahamson (Somerset East) moved, as an amendment to insert the word "conspicuous" before "notice."

On a vote being taken, the amendment was agreed to, and the motion, as amended, was agreed to.

CHEMICAL ANALYSIS OF SOILS.

Mr. Douglass (Koonap Heights) moved: "Congress would respectfully urge upon Government the necessity for increasing the facilities accorded through the Analytical Department to farmers for the chemical examination of soils, and of agricultural products; and, in order that fuller advantage may be taken of such opportunities, such facilities be more widely notified for the information of the public interested than has been the practice in the past." Seconded by Mr. Heynes (George), and agreed to.

CONTROLLING THE QUALITY OF SEEDS.

Mr. Lee (Zwart Ruggens) moved "That this Association is of the opinion that there exists a great need for controlling the quality of all seeds, fertilizers and farm foods, in accordance with the proposed Bill of last Session and published in the *Agricultural Journal* of June, 1906." Seconded by Mr. Gardner (Upper Albany).

On a vote being taken, the motion was agreed to.

EXHIBITION OF EXPERIMENTAL WORK.

Mr. W. Edmonds (Komgha) moved "That the Agricultural Department be asked, at the forthcoming agricultural shows and elsewhere, as may prove convenient, to give an exhibition of their experimental work, and of all such grasses, grains, fruits, cereals, plants, seeds, woods, fibres, wools, ticks, instruments, etc., which may prove beneficial to the farming community and a means of increasing the Colony's usefulness." Seconded by Mr. Evans (Bedford), and agreed to.

NOXIOUS WEEDS.

Mr. Collins, M.L.A. (Victoria East) moved "That the important matter with regard to the eradication of noxious weeds should have the serious attention of Parliament during the ensuing session, and that this Congress favours legislation." Seconded by Mr. McDonald (Whittlesea).

Mr. Abrahamson (Somerset East) moved, as a rider: "On the lines recommended by the recent Select Committee of the House of Assembly for a Compulsory Act to be enforced throughout the Colony."

Mr. Gardner (Upper Albany) moved, as an amendment, "That this Congress request the Government to thoroughly investigate the spread of the noxious weeds known as Jointed Cactus and Burrweed, and other noxious weeds, and obtain information as to the most effective and economical means of destroying the same, with the view of simultaneous action being taken to eradicate them."

On a vote being taken, the rider was agreed to, the motion, as amended, was agreed to (Mr. Gardner's amendment lapsing). The resolution reading "That the important matter with regard to the eradication of Noxious Weeds should have the serious attention of Parliament during the ensuing session, and that this Congress favours legislation on the lines recommended by the recent Select Committee of the House of Assembly for a Compulsory Act to be enforced throughout the Colony."

Eradication of Weeds at Owner's Expense.

Mr. Evans (Bedford) moved: "This Congress is strongly of opinion that the law relating to the eradication of noxious weeds should be amended by a clause giving authority to Divisional Councils to eradicate burrweed at the expense of the owner, when in the opinion of such Councils it is advisable to do so." Seconded by Mr. J. Arnold, and agreed to.

Jointed Cactus.

Mr. Evans (Bedford) moved: "This Congress would direct attention to that serious menace to the country, the rapid spread of the Jointed Cactus (*Opuntia pusilla,* Haw), and strongly urges the Government to introduce legislation for its compulsory eradication upon the lines recommended by the Select Committee last session; and further legislation strictly prohibiting the introduction of any species of the cactus tribe into the Colony without the approval of the Government Botanist, and then only when he is satisfied that the plant is useful for fodder purposes, and is not liable to spread and become a pest." Seconded by Mr. Roberts (Fort Beaufort).

Mr. Francis (Molteno) moved, as a rider: "And that a Government Botanist be appointed."

Congress adjourned at 6 o'clock.

EVENING SITTING.

Congress resumed at 8 o'clock.

Jointed Cactus.

The debate on this subject was resumed.

Mr. Gunning (Griqualand West, Kimberley) moved, as an amendment, to omit the words from "legislation" down to "Session," and insert "for the prompt and speedy eradication of this weed by Government."

On a vote being taken, Mr. Gunning's amendment was negatived, Mr. Francis's amendment was agreed to, and the motion, as amended, was agreed to.

ELECTION OF OFFICERS.

Mr. Arnold moved that Mr. Francis take the chair.—Agreed to.

The Chairman called for nominations for the office of President.

Mr. J. Arnold (Vice-President) nominated Mr. Hockly, who was elected by loud acclamation and with musical honours.

Mr. Hockly suitably and feelingly acknowledged the reception accorded him, and resumed the chair.

The President called for nominations for the office of Vice-President.

Mr. Roberts (Fort Beaufort) nominated Sir E. Y. Brabant, who declined with regret.

Mr. Baker (Willowmore) nominated Mr. Hurndall, M.L.C.

Mr. Roberts (Fort Beaufort) nominated Mr. J. Arnold.

There being no further nomination, the Chairman declared these gentlemen elected by acclamation.

Messrs. Hurndall, M.L.C., and J. Arnold returned thanks for the honour conferred upon them.

The President called for nominations for the office of Secretary.

Mr. Francis (Molteno) nominated Mr. Hall.

There being no further nomination, the President declared Mr. Hall elected by acclamation.

Mr. Hall acknowledged the compliment.

VIGILANCE COMMITTEE.

The President called for nominations for the Vigilance Committee.

The following were nominated: Messrs. Roberts, Lee, Moffat, Joubert, Adams, Baker, Evans, Edmeades, Francis, and W. Edmonds.

Mr. Murray was also nominated, but he absolutely declined to stand.

Messrs. Butler (*Midland News*) and Walton (*Herald*) were asked, and consented, to act as Scrutineers.

The Scrutineers announced that Messrs. Adams, Joubert, Lee, and Moffat were elected.

These gentlemen acknowledged the honour conferred on them.

SCALE FOR MIMOSA.

Mr. Evans (Bedford) moved "That Congress request the Agricultural Department to instruct the Entomologist to enquire into the possibility of procuring quantities of the species of scale known to be destructive to the Mimosa; and if successful to distribute such scale to farmers desiring same.'' Seconded by Mr. Weir (Bolotwa).

After debate, the motion was withdrawn with leave of Congress.

PLACE FOR NEXT CONGRESS.

The President called for proposals for the place at which the next meeting shall be held.

Kimberley, Cradock and Mafeking were proposed, and, on a vote being taken, Kimberley was agreed to.

INCREASED PUNISHMENT FOR STOCK THEFTS.

Mr. Weir (Bolotwa) moved ''That in the opinion of this Congress the punishment at present inflicted on stock thieves is totally inadequate, and that Government be requested to impose severer punishment, empowering magistrates to inflict lashes for the first offence. And, further, that a committee be appointed to lay the whole matter before the Government during the next session of Parliament, as nothing has been done during the last session, and no mention made of it in the Parliamentary Committee's Report, notwithstanding the fact that similar resolutions have been repeatedly passed by former Congresses.'' Seconded by Mr. Frost (Tarka).

Mr. Francis (Molteno) moved, as an amendment, to omit the words ''empowering the magistrates to inflict lashes for the first offence.''

Mr. C. G. Lee (Zwart Ruggens), moved, as a further amendment, ''That all natives shall be required to have in their possession stamped passes when removing stock which do not belong to their employers. That the Divisional Council, together with the Farmers' Association, where such exist in a district, nominate the persons who are enabled to issue such stamped passes; that the Government appoint such persons; that convicted stock thieves receive a minimum of twelve months' imprisonment for the first offence, and pay double the value of the stock; imprisonment and lashes for the second offence; and that this Congress appoint a committee to whom this resolution be entrusted.''

Mr. Laing (Xalanga) moved, as a further amendment, to omit the word ''lashes'' and insert ''three years' imprisonment.''

On a vote being taken, Mr. Francis's amendment was agreed to, Mr. Laing withdrew his amendment with the leave of Congress; the motion, as amended, was agreed to (Mr. Lee's amendment, therefore, lapsing), as follows: ''That in the opinion of this Congress the punishment at present inflicted on stock thieves is totally inadequate, and that Government be requested to impose severer punishment. And, further, that a committee be appointed to lay the whole matter before the Government during the next session of Parliament, as nothing has been done during the last session, and no mention made of it in the Parliamentary Committee's Report, notwithstanding the fact that similar resolutions have been repeatedly passed by former Congresses."

Mr. Joubert (Lady Grey) asked leave to move an unopposed motion, and leave being granted, moved "That Messrs. Arnold, Hurndall, M.L.C., and Lee be deputed to interview the Government and the Chief Justice on the resolution *re* Stock Thefts passed this evening." Seconded by Mr. Pietersen, and agreed to.

RE-EARMARKING OF SHEEP.

Mr. McDonald (Whittlesea) moved "That re-earmarking of stock be punishable by law, and also obliterating brands." Seconded by Mr. Rehbok, and negatived.

MORE POLICE WANTED.

Mr. Hall (on behalf of Hay) moved "That Congress would respectfully impress upon Government the necessity of increasing the police in the country districts of the Colony; that more scope be allowed the police in regard to carrying out their duties in arresting vagrants, thieves and deserting labourers." Seconded by Mr. Francis (Molteno), and agreed to.

PAYMENT OF POLICE ESCORTING PRISONERS.

Mr. Gunning (Griqualand West, Kimberley) moved "That members of the C.M.R. and C.M.P. be, in all cases, reimbursed their actual expenses in escorting prisoners to Magistrates' Courts." Seconded by Mr. Hall (Bedford), and agreed to.

POLICE NORTH OF ORANGE RIVER.

Mr. Maclachlan (Vryburg) moved "That Congress urge upon Government the necessity for increasing the rate of pay to the police north of the Orange River." Seconded by Mr. N. White, and agreed to.

REMOVAL OF OFFICERS AND NON-COMS.

Mr. Field (Lower Cathcart) moved "That it is detrimental to the best interests of the Cape Police and also of the country in general, that officers and non-coms. of that force should be removed from a district with which they have become thoroughly acquainted, and are doing good work, to other districts to which they are absolute strangers, and would ask the Government to remedy same." Seconded by Mr. Stephens (Cathcart).

Colonel Robinson, commanding Cape Police, spoke on this question.

Mr. Murray (Zwart Ruggens) moved the previous question. Seconded by Mr. Pietersen. Mr. Field withdrew his motion with the leave of Congress.

TRAVELLING LECTURERS.

Mr. Lee (Zwart Ruggens) moved "That Congress approach Government at an early date with the view of representing the need of travelling lecturers who are qualified to lecture upon agricultural subjects, and accompany such lectures by demonstrations where practicable. That such lectures and demonstrations be given in different parts of the Colony in accordance with a previous planned tour, which will be duly advertised in the *Agricultural Journal.* All interested in agriculture being entitled to attend such lectures. That railway concession fares be granted to *bona fide* agriculturists to attend such lectures. That Congress vote the sum of £——to be distributed as prizes for the best essays written upon any lecture or demonstrations." Seconded by Mr. Flynn (Phokwani).

Mr. Rehbok (Molteno) moved, as an amendment, to omit the fourth clause.

On a vote being taken, the amendment was negatived, and the motion was agreed to.

Congress adjourned at 11.30.

FRIDAY, MARCH 15, 1907.

EVENING SITTING.

Congress resumed at 8 o'clock.

POULTRY BREEDING.

Mr. Flynn (Phokwani) moved "That means be adopted to bring more prominently before farmers and others the many advantages to be derived from the systematic breeding of poultry, and that Congress is of opinion Government might aid this beneficial object by the employment of expert lecturers at various centres throughout the Colony." Seconded by Mr. N. White (Phokwani), and agreed to.

Mr. Currie (Upper Albany) moved "That Congress urges on Government the necessity for instigating enquiries as to the advisability of adopting the double-deck truck system for the transportation of small stock by rail." Seconded by Mr. J. Arnold, and agreed to.

RAILWAY RATES ON WOOD AND IRON.

Mr. Flynn (Phokwani) moved "Congress is of opinion that rough wood and iron used on farms for shedding purposes should be carried by our railway at same rate as fencing materials." Seconded by Mr. Goosen (Mafeking).

Mr. Lee (Zwart Ruggens) moved, as an amendment, to insert after the word "that" the words "from this date" and to omit the word "purposes" and insert "for small stock in British Bechuanaland." On a vote being taken, the amendment was negatived, and the original motion was negatived.

Mr. Flynn called for a division, which resulted as follows:—Ayes: Adams, Weir, Lanham, Heynes, Robertson, Goosen, White, De Jager, Southey, De Villiers, Oosthuisen, Mulder, Edmeades, Flynn, Douglass, Sills, Christian, Cumming, Frost, Moffat, Gilfillan, Bowker, Weyer, Lee, Arnold, Rehbok, Gunning, Dell—28. Noes: Francis, Joubert, Brabant, Collins, Odendaal, Flanagan, Stephens, Field, Edmonds, Smith, Gush, Evans, Currie, Gardner, Abrahamson, Baker, Van Niekerk, McDonald, Pietersen, Murray, Hurndall, Hall, Hockly—23.

The motion was, therefore, agreed to.

Railage on Manures.

Mr. Laing (Xalanga) moved "That Government be asked to carry fertilizers and manures over their railways at a rate similar to that chargeable on fencing wire." Seconded by Mr. Frost (Tarka).

Mr. Flynn (Phokwani) moved, as an amendment, after the word "manures" to insert "with the exception of Government guano from the guano islands."

On a vote being taken, both amendment and motion were negatived.

Market Passes at Reduced Rates.

Mr. Flynn (Phokwani) moved "That in the opinion of Congress, Government should grant farmers yearly market passes on the railways enabling them to travel at reduced rates from the nearest stations or sidings to their farms, to the nearest large towns for the disposal of their produce." Seconded by Mr. White (Phokwani), and negatived.

Mr. Mulder (Oudtshoorn) moved "That Congress discuss the better regulation of the Cape Railway Service." Seconded by Mr. Joubert (Lady Grey), and withdrawn with the leave of Congress.

Registration of Brands Act.

Mr. Douglass (Koonap Heights) moved "That Congress approve of the suggested Registration of Brands, under Circular issued by the Agricultural Department on the 18th July, 1905, and urge Government to introduce an amended Brands Regulation Act next session, by which no two farmers in the Colony can use the same brand." Seconded by Mr. Christian (Cradock), and agreed to.

Licenses for Sale of Meat.

Mr. Baker (Willowmore) moved: "With a view to (a) Encourage the sale of Colonial meat; (b) Increase the number of Colonial meat sellers; (c) Reduce the cost of Colonial meat to the consumer; (d) Prevent the opening of temporary shops, to crush competition; and (e) Prevent the sale of imported meat as Colonial— Congress respectfully urges Government to bring before Parliament a Bill for the issue of different licences to Colonial and imported meat sellers respectively. 1—An annual licence to sell Colonial meat *only*, £2. 2—An annual licence to sell imported meat *only*, £50. With a heavy penalty and withdrawal of licence on conviction of selling other than the meat he is licensed to sell." Seconded by Mr. Arnold.

Mr. Adams (Griqualand West, Kimberley) moved, as an amendment, to eliminate paragraphs 1 and 2, and to add as a rider the following: "and further advocates the increase of the meat duties at the earliest date possible, in view of the abundance of stock available for local consumption."

Mr. Edmonds (Komgha) moved, as a further amendment: "Congress strongly urges that the Bill of last year to prevent a monopoly in the meat trade, be introduced by Government during the ensuing session."

Mr. Lee (Zwart Ruggens) moved, as a rider to Mr. Edmonds's amendment: "This Congress greatly regrets that the Bill was thrown out by the Upper House, which fact has acted detrimentally to the Colony."

On a vote being taken, Mr. Adams's amendment and rider were negatived, Mr. Baker's motion was negatived, Mr. Lee's rider was agreed to, and Mr. Edmonds' amendment, as amended, was agreed to, as follows: "Congress strongly urges that the Bill to prevent a monopoly in the meat trade of last year be re-introduced by Government during the ensuing session; and, further, that this Congress greatly regrets that the Bill was thrown out by the Upper House, which fact has acted detrimentally to the Colony."

Mr. Joubert (Lady Grey) moved the adjournment, which was agreed to.

Congress adjourned at 10.40 p.m.

SATURDAY, MARCH 16, 1907.

MORNING SITTING.

Congress resumed at 9 o'clock.
Minutes read and confirmed.

INVITATION.

Mr. Edmeades, on behalf of the Oudtshoorn Agricultural Society, invited all members who are staying over, to the Agricultural Dinner.

AUDITORS' REPORT.

The consideration of the Auditors' Report was resumed.

Mr. Moffat (Tarka) moved "That Congress ask each Branch to contribute the sum of one shilling per member, over and above the capitation fee, this year, in order to place the finances of the Central Association on a better basis, and to meet the deficiency of the Bonus Fund." Mr. Evans (Bedford) seconded, and the motion was agreed to.

Mr. Lee (Zwart Ruggens) moved "That as soon as convenient after Congress, all accounts due by the Branches be sent them, with an urgent request to settle same." Seconded by Mr. Evans (Bedford), and agreed to.

Mr. Francis (Molteno) moved the adoption of the Report. Seconded by Mr. Moffat (Tarka), and agreed to.

DIRECTOR OF IRRIGATION.

The President invited the Director of Irrigation (Mr. Kanthack) to address Congress, and on that gentleman rising to do so, he was received with acclamation.

The President invited the Commissioner of Police (Colonel Robinson) to address Congress, and on that gentleman rising to do so, he was received with acclamation.

RAILWAY RATES IN NORTH.

Mr. Maclachlan (Vryburg) moved "That this Congress respectfully request the Government to seriously consider the reduction of railway rates to the north-eastern districts and Bechuanaland, in particular, on such materials as are necessary for the agricultural development of such parts, and Congress recommends that such reductions be on a level with the rates charged to the Transvaal." Seconded by Mr. Adams (Kimberley).

Mr. Lee (Zwart Ruggens) moved, as an amendment, to insert the word "British" before "Bechuanaland."

On a vote being taken, the amendment was agreed to, and the motion, as amended, was agreed to.

RAILWAY RATES FOR LABOURERS.

Mr. Maclachlan (Vryburg) moved "That Congress reaffirm the resolution *re* farm labourers as agreed to at last Congress, *viz.*:—That in the opinion of Congress the privilege of getting up farm labourers from any station on the Eastern System to any station in the Colony at 5s. per head, be extended to getting them from any station in the Colony, and that it apply to the labourer's family." Seconded by Mr. Evans (Bedford), and agreed to.

REFRIGERATOR CARS.

Mr. Gilfillan (Midlands) moved "That this Congress would urge on Government the necessity of having cool cars attached to trains, say, once a week, from November to April, for the transport of perishables during the hot months." Seconded by Mr. Flynn (Phokwani).

Mr. Stephens (Cathcart) moved, as an amendment: "This Congress would urge on Government the necessity of having cool cars attached to trains daily, during the hot months, and that cool chambers be erected at all stations, where the trade warrants it, for the storage of perishables."

On a vote being taken, the amendment was agreed to.

COOL CARS.

Mr. Hall (Bedford) moved "That the Agricultural Department be requested to institute a series of experiments with a view to devising a cool car in which a moderately low temperature, say, 55 to 60 degrees, can be obtained and maintained without recourse to ice, say, by utilising the well-known principle of evaporation for the reduction of temperature."

Seconded by Mr. Arnold, and agreed to.

COLD STORAGE CHAMBERS.

Mr. Maclachlan (Vryburg) moved "That it is in the interest of the farming community that the Government should hasten the erection of Cold Storage Chambers at convenient centres with a view to facilitate the transport of meat and the handling of dairy produce."

Seconded by Mr. Flynn (Phokwani), and withdrawn with the leave of Congress.

MASTERS AND SERVANTS ACT.

Mr. Flynn (Phokwani) moved "That Congress is of opinion that the present Masters and Servants Act requires amending so as to more effectually protect the employer against the frequent desertions of the servants." Seconded by Mr. Weyer (Somerset East).

Mr. Francis (Molteno) moved as an amendment "That the Masters and Servants Act be so amended that a servant who has deserted his master's service can be arrested without a warrant."

Mr. Flynn withdrew his motion with the leave of Congress.

Mr. Lee (Zwart Ruggens) moved, as a further amendment, to insert "by the police" after "arrested."

Mr. Adams (Kimberley) moved, as a further amendment, to insert after the word "servant" the words "as defined in Section 2, Act. 18 of 1873."

On a vote being taken, Mr. Lee's amendment was agreed to, Mr. Adams's amendment was agreed to, and the motion, as amended, was agreed to, as follows: "That the Masters and Servants Act be so amended that a servant (as defined by Section 2, Act 18, of 1873), who has deserted his master's service, can be arrested by the police without a warrant."

SERVANTS' CHARACTERS.

Mr. Oosthuisen (Steynsburg) moved "That the Central Association is of opinion that the Masters and Servants Act should be amended to such an extent as to enable masters to give servants characters." Seconded by Mr. Flynn (Phokwani), and withdrawn with the leave of Congress.

DECENT CLOTHING.

Mr. Rehbok (Molteno) moved "That after the word 'decency' in Section 10 of Act 23 of 1879, the words 'or any person being found in any such place clothed only in loose blankets' be inserted." Seconded by Mr. Francis (Molteno), and agreed to.

LIQUOR IN PROHIBITED AREAS.

Mr. Francis (Molteno) moved "That any native found in possession of intoxicating liquor in any area in which the sale of intoxicating liquor is prohibited to natives, shall be liable to punishment by fine or imprisonment, and that the liquor laws be amended to this effect; and further, that such punishment shall be increased if such native does not prove where he obtained such liquor." Seconded by Mr. Rehbok (Molteno), and agreed to.

REPORT OF COMMITTEE ON SECTIONAL DISCUSSION.

The report of the committee on the Cradock resolution *re* Sectional Discussions, was read as follows:—

Your committee having considered the proposals of the Cradock Branch, recommend:—

1. That all Branches be urged to send in their resolutions before the 30th November to the Secretary of the Central Association, who shall forthwith classify them and have them printed, and send them to each Association.
2. That each group of resolutions be printed on slips with a wide margin to facilitate alterations.
3. That the Executive and Vigilance Committee revise the agenda before the meeting of Congress, and group the subjects, and then present them to delegates in charge of resolutions, the delegates then to meet in committee to condense them in a form to present to Congress.
4. That the daily order of business be arranged by the Executive and Vigilance Committee.

Mr. Murray (Zwart Ruggens) moved the adoption of the Report. Seconded by Mr. Moffat (Tarka), and agreed to.

IMPORTATION OF STUD STOCK.

Mr. Hall moved (for Bolo): "That Congress request the Agricultural Department to undertake for members of all Farmers' Associations affiliated with the Central, the importation of a consignment of Stud Merino Rams and Ewes from Australia, at cost price, for the use of members applying for them, on the same lines as was recently undertaken by the Orange River Colony." Seconded by Mr. Laing (Xalanga).

Mr. Gardner (Upper Albany) moved, as an amendment, to omit the words "affiliated with the Central."

On a vote being taken, the amendment was agreed to, and the motion, as amended, was negatived.

FREE RAILWAY PASSES.

Mr. Mulder (Oudtshoorn) moved "That on the occasion of the holding of Farmers' and other Congresses of a like nature, the Government should provide free Railway Passes to all accredited delegates of duly registered Associations." Seconded by Mr. Heynes (George).

Mr. A. H. Murray (Zwart Ruggens) moved, as a rider: "As such passes are granted to delegates to the Agricultural Union Congress and Horticultural Board."

Mr. Butler (Cradock), moved, as an amendment, "That in the opinion of Congress, delegates to the Central Association, Agricultural Union, and Horticultural Board be placed on the same footing as regards railway passes."

Messrs. Murray and Mulder withdrew their motions, and Mr. Butler's amendment was agreed to.

FALSE PACKING.

Mr. McDonald (Whittlesea) moved "That Congress earnestly desires to bring to the notice of the Government the amount of 'false packing' now being carried on in the Colony, and earnestly requests the Government to bring in an Act compelling producers to place their full name and address on all produce for sale, and to impose a heavy fine on any person found guilty of such fraudulent false packing."

Seconded by Mr. Sills (Wodehouse), and withdrawn with the leave of Congress.

AGRICULTURAL COLLEGES.

Mr. Field (Lower Cathcart) moved "That this Congress reaffirms the resolution passed at King William's Town in April, 1903, *viz.*, 'Congress again urges the necessity of widening the scope and extending the usefulness of the Agricultural College at Elsenburg by establishing at least two more branches—one in the Eastern Province and one in the Midlands of the Colony.'" Seconded by Mr. Stephens (Cathcart).

Mr. Abrahamson (Somerset East) moved, as an amendment, to omit the word "branches" and insert "experimental stock and agricultural farms."

Mr. Pietersen (Somerset East) moved, as a further amendment, to insert after "college" the words "and experimental farms."

Mr. Lee (Zwart Ruggens) moved, as a further amendment, to insert, after the word "branches," the words "with sufficient land to give instruction on experimental farming."

On a vote being taken, Mr. Abrahamson's amendment was negatived, Mr. Lee's amendment was agreed to, and the motion, as amended, was agreed to, Mr. Pietersen's amendment being withdrawn with the leave of Congress.

FARMERS' TELEPHONES.

Mr. Evans (Bedford) moved: "This Congress is of opinion that farmers should be permitted to run telephone wires along existing farm fences at their own expense, such wires to be connected with a post office where possible, and that no charge be made for the use of such telephone wires." Seconded by Mr. Arnold.

Mr. Joubert (Lady Grey) moved, as an amendment, after the word "post office" to insert the words "railway station or siding."

Mr. Abrahamson (Somerset East) moved, as a further amendment, to omit the word "no" and insert the word "moderate."

Mr. Lee (Zwart Ruggens) moved, as a further amendment, to omit the words "no charge" and insert "charge to be made to cover bare cost," and to add, as a rider, "and that any damage done to tel phone on fence be made a criminal offence."

On a vote being taken, Mr. Joubert's amendment was agreed to, Mr. Abrahamson's amendment was negatived, Mr. Lee's amendment and rider were agreed to, and the motion, as amended, was agreed to, as follows: "This Congress is of opinion that farmers should be permitted to run telephone wires along existing farm fences at their own expense, such wires to be connected with a post office, railway station or siding, where possible, and that a charge to cover bare cost be made for the use of such telephone wires. And, further, that any damage done to a telephone wire on any fence be made a criminal offence."

Mr. Arnold asked leave to move an unopposed motion, and leave being granted, moved "That the resolution *re* farmers' telephones be referred to the committee who will interview Government *re* stock thefts."

Seconded by Mr. Evans (Bedford), and agreed to.

An adjournment for ten minutes was agreed to, but, on resuming, more than half the delegates were absent, and the Secretary said he feared that members had misunderstood the adjournment to be till 8 p.m.

WINDING UP COMMITTEE.

It was resolved to appoint the Winding Up Committee, and Messrs. Lee, Joubert, Gardner, Arnold, and Francis were elected.

Mr. Arnold moved that Congress adjourn till 8 p.m. Seconded by Mr. Lee, and agreed to.

Congress adjourned at 4.30 p.m.

EVENING SITTING.

Congress resumed at 8 o'clock.

TAX ON NATIVES' DOGS.

Mr. Gunning (Kimberley) moved: "This Congress urges Government to devise some more effective measures for the preservation of game, particularly by the imposition of a heavy tax on natives' dogs." Seconded by Mr. Aucamp (Kimberley).

Mr. Collins (Victoria East) moved, as an amendment, to omit the word "native."

On a vote being taken, Mr. Collins's amendment was agreed to, and the motion, as amended, was negatived.

GAME IN GOVERNMENT FORESTS.

Mr. Dell (King William's Town) moved "That all hunting with guns or dogs be entirely stopped on all Government lands, as those places will form the breeding camps for the future game, and that all foresters be instructed to lay poison." Seconded by Mr. Stephens (Cathcart).

Mr. Lanham (Vryburg) moved, as a rider: "And that special provision be made in British Bechuanaland for the protection of royal game; and, further, that Paauw, Guinea Fowl, and Korhaan, which are amongst the best of our locust-eating birds, be protected for two years."

Mr. Roberts (Fort Beaufort) moved, as an amendment to the amendment, to omit the words "Guinea Fowl."

Mr. Roberts's amendment was agreed to, the amendment, as amended, was negatived, and the motion was agreed to.

EXECUTIVE COMMITTEE'S REPORT.

Mr. Maclachlan (Vryburg) moved "That Congress re-affirm the instructions to the Parliamentary Committee (passed at Somerset East), asking them to report as early as possible, and that the report be issued to all Associations at least three months before the following Congress." Seconded by Mr. White (Phokwani), and withdrawn with the leave of Congress.

Mr. Rehbok (Molteno) moved "That it is desirable, to prevent fraud, that any person other than a market-master or assistant market-master, giving or signing a market note shall be liable to punishment by fine or imprisonment; and, further, that any market-master or assistant market-master giving or signing any market note for produce which has not been sold by him on the market shall be liable to similar punishment." Seconded by Mr. Francis (Molteno), and negatived.

GOLD LAWS.

Mr. N. White (Phokwani) moved "That in the opinion of Congress Government should cause an early and searching enquiry into the Colonial Gold Laws, with a view to opening up the well-known auriferous wealth of the Colony. That as farming is the paramount industry of the Colony, it cannot remain indifferent on a question thus vitally affecting its interest." Seconded by Mr. Maclachlan (Vryburg), and negatived.

CREDIT SYSTEM.

Mr. Goosen (Mafeking) moved: "Congress heartily approves of the action of Government in taking steps to introduce the Agricultural Credit System." Seconded by Mr. Gunning (Kimberley).

On a vote being taken, the motion was agreed to unanimously.

THANKS TO GOVERNMENT.

Mr. Arnold asked leave to move an unopposed motion, and leave being granted, he moved "That this Congress heartily thanks the Government for referring the Agricultural Credit System to them, and trust they will carry the measure next session." Seconded by Mr. Joubert (Lady Grey), and agreed to unanimously.

TAX ON STALLIONS.

Mr. Evans (Bedford) moved "That this Congress urges that a tax on stallions will improve the stamp of horses bred in the Colony by eliminating worthless sires." Seconded by Mr. Hall (Bedford).

Mr. Elley (Veterinary Surgeon) addressed Congress on this matter.

Mr. Abrahamson (Somerset East) moved, as an amendment, "That this Congress urges that a tax be imposed on stallions over two years, other than pedigree animals, and those entered in the Auxiliary Stud Book of the Cape Stud Breeders' Association."

On a vote being taken, the motion was negatived, and the amendment was negatived.

WHEEL TAX.

Mr. Lanham (Langberg) asked leave to move an unopposed motion dealing with a Wheel Tax. A member opposing, leave was not granted.

OFFICIAL MINUTES.

Mr. Lee (Zwart Ruggens) asked leave to move an unopposed motion, and, leave being granted, moved "That, in addition to the form in which the Official Minutes have been published, the resolution, when amended in any way, shall be printed in the form as finally passed at Congress. Seconded by Mr. Roberts (Fort Beaufort), and agreed to.

PAYMENTS FOR JACKAL DESTRUCTION.

The Secretary read the following telegram from the Director of Agriculture: "Your wire to Premier *re* Vermin Rewards. I regret it is impossible, owing to the necessity for curtailment of expenditure, to consider the question of resumption of payment of rewards this financial year. It is proposed to bring the whole question under the consideration of Parliament with a view, if possible, of devising a more effectual and economical method of accomplishing the object. The views of your Association will be considered in dealing with the question."

INVITATION BY THE AGRICULTURAL UNION.

Telegram read from the Secretary of the Agricultural Union, as follows: "The Executive of the Union invites the Central Association to nominate two or three delegates as representatives to the Inter-Colonial Agricultural Union Congress at Pretoria in August. Please submit."

Letter read from Mr. C. G. Lee, President of the Inter-Colonial Agricultural Union, also inviting Congress to elect delegates, and stating that, if Congress decides to do so, "it will be a matter of arrangement between your Association and the Cape Union as to how many delegates each body sends."

Mr. Roberts (Fort Beaufort) moved "that the invitation be accepted." Seconded by Mr. Evans (Bedford).

Mr. Flynn (Phokwani) moved, as an amendment, "That as the invitation has been received at such a late hour, this Congress regrets it is too late to accept the invitation."

Mr. Edmonds (Komgha) moved "That the matter be referred to the Executive."

Mr. Francis (Molteno) moved, as an amendment, "That the matter stand over till next Congress."

Mr. Roberts withdrew his motion with the leave of Congress.

DELEGATES TO THE O.R.C. FARMERS' CONGRESS.

Mr. Stuart, representative from the O.R.C. Farmers' Congress, extended a warm invitation to send delegates to their next Congress. He thanked Congress for the reception accorded him.

Mr. Hurndall, M.L.C., moved that two delegates be sent to the O.R.C. Conference. Seconded by Mr. Arnold, and agreed to.

Mr. Arnold nominated the President and Secretary to be the delegates.—Agreed to.

Mr. Joubert moved that the Vice-Presidents be the alternatives.—Agreed to.

THANKS FOR EXPERTS.

Mr. Lee (Zwart Ruggens) moved "That this Congress appreciates the attendance at Congress of the heads of some of the sections of the different Government Departments, which come in direct touch with the farmers. Further, Congress regrets the absence from the meeting of the Director of Agriculture, and also regrets that Dr. Nobbs left Congress before the close of the session.''—Agreed to.

VOTES OF THANKS.

To Mr. E. T. L. Edmeades, and the Farmers' Association of Oudtshoorn, for the magnificent hospitality and cordial welcome given to Congress. To Mr. Edmeades, and the Agricultural Society, for the invitation to the Agricultural Dinner. To Mr. Lind (Mayor), and the Town Council, for their cordial welcome and use of the Town Hall. To Mr. Matare, and the Chamber of Commerce, for their welcome. To Mr. Wrensch, C.C. and R.M., for the loan of Acts of Parliament. To the Government Experts, Colonel Robinson (commanding Cape Police), Messrs. Kanthack (Director of Irrigation), Davison (Chief Inspector of Sheep), Dewar (Eastern Province Entomologist), Dr. Nobbs, and Mr. Elley (Veterinary Surgeon).

BONUS TO SECRETARY.

Resolved that the Secretary be accorded a bonus of £40.

DELEGATES' EXPENSES.

Mr. Francis moved ''That delegates' out of pocket expenses be paid.'' Seconded by Mr. Joubert, and agreed to.

Mr. Hurndall, M.L.C., moved a hearty vote of thanks to the President, which was agreed to with musical honours.

The President responded.

WINDING UP COMMITTEE'S REPORT.

The Report of the Winding Up Committee was read and adopted on motion by Mr. Hurndall, M.L.C.

Mr. Roberts moved ''A hearty vote of thanks to the Secretary.'' Agreed to, with musical honours.

The minutes were read and confirmed, and Congress closed.

W. H. HOCKLY, *President.*

THOS. C. HALL, *Secretary.*

EXPERIMENTS WITH OSTRICHES.

I

By Professor J. E. Duerden, Rhodes University College, Grahamstown.

A recent clipping of two ostrich chicks, kept under the same experimental conditions, had disclosed some interesting results in feather production. A feather from the one chick is shewn in Fig. 1, and from the other in Fig. 2. It will be seen that the first is a chick feather of a somewhat superior type, having a thin light shaft, and broad uniform flue, with strong self-supporting barbs standing at right angles to the shaft, and altogether free from bars. The second feather is of only moderate quality, and is divisible into two very distinct regions: (1) An upper part, in which the feather shews the normal growth, with rather narrow flue, the barbs inclined at an angle to the shaft and feebly barred; (2) A lower part in which the flue is imperfectly developed, the barbs being short and irregularly arranged.

The history of the chicks is as follows: Both are from good strains, and were offered for experimental purposes, the first by Mr. Alfred White, Clifton, P.O. Hell Poort. When obtained, each was about two and a half months old. The first chick, having come only a short distance, was received in good condition, soon settled down to its new surroundings, has grown rapidly and uniformly ever since without any drawbacks, and has remained altogether free from parasites, except for the presence of a few mites along the inner groove of the shaft of the feather. The second chick had been considrably knocked about when received, and was injured to such a degree that it was unable to stand for a day or two, the feathers and skin from parts of its back being also worn off. With these injuries the chick failed to make proper growth; moreover, its dung shewed it to be infested with tapeworms, and mites were plentiful on the feathers. Left to take its own course for purposes of investigation, the chick is at present only about two-thirds the size of the first, although the two have been kept under exactly the same outward conditions; indeed, it is now outstripped in growth by two other chicks obtained about the same time, but a month or more younger, and kept in the

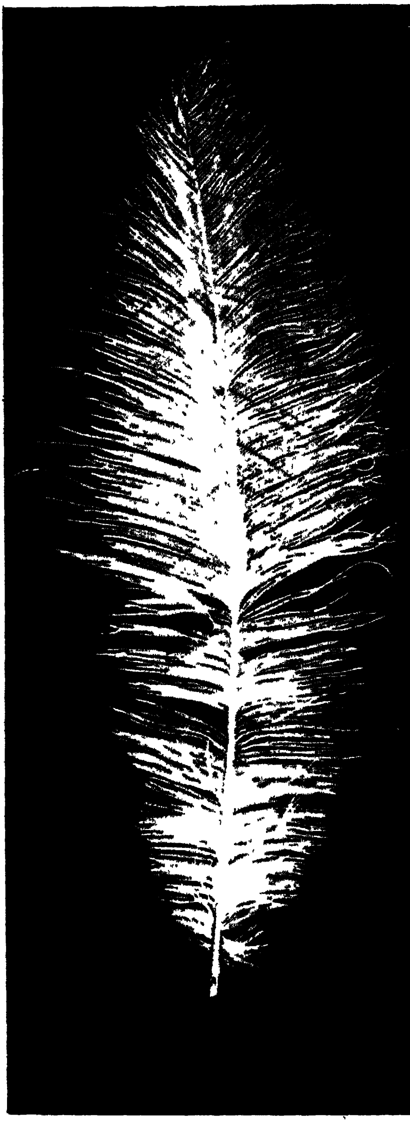


Fig. 2.

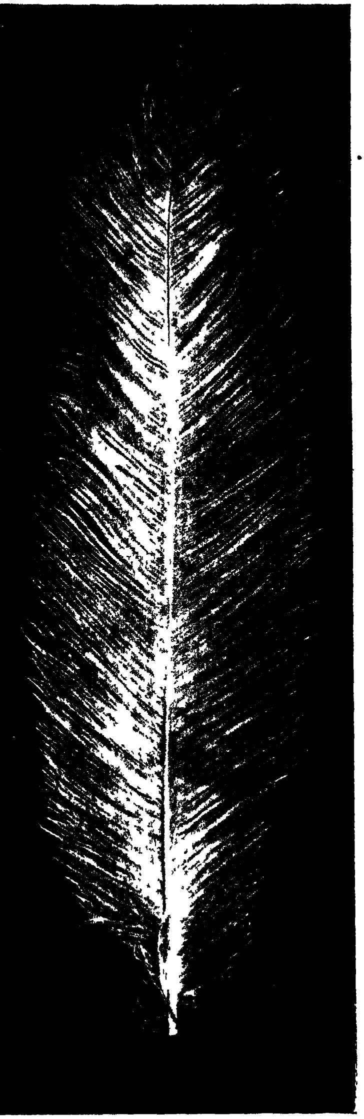


Fig. 1.

same camp and fed alike. Compared with the rest, the chick has a slightly emaciated appearance, being very thin in the hip region. All have been supplied with an abundance of nourishing food, and kept under as favourable conditions as possible.

It is manifest that the general condition of the two chicks thus described is to be closely correlated with the character of their feathers, as shewn in the photograph. The White chick has maintained throughout a regular growth without any check, and we get the same uniformity of growth in the feather, an absence of defects from beginning to end. In the other chick a marked interruption in the growth of the feather occurs about midway, which obviously corresponds with the time of the greatly enfeebled condition of the bird as received. Moreover, the uniformly poor state of health of the bird for the remaining three months may be taken to account for the imperfect growth of the lower half of the feather.

Such extremely close relationships between the nutritive condition of the ostrich and the character of the feathers produced during the same period are well known to ostrich farmers, though the cause and effect are not always so striking as in the present instance, where the birds have been kept under close observation, and their condition followed from day to day. It is well that such straightforward cases should be placed on record for building up our knowledge of the ostrich. Ostriches generally appear to be highly sensitive birds as regards their constitution, and any lowering of condition is at once reflected in the feathers, usually resulting in a check in the growth, which becomes manifest as a bar, or, in very enfeebled cases, as a partial loss or complete absence of the flue. Nearly all farmers can point to instances where even some change of pasturage or food, some special treatment or accident to a bird, dipping against parasites, or a short spell of cold, rainy weather, has brought about certain constitutional changes in the bird which become evident by the appearance of a bar or defect in the growing feather. The feathers of birds kept in a high nutritive condition shew few or no bars, but it must be acknowledged there is much yet to be learnt as to how best to maintain the bird in such a desirable state. We are yet only at the beginning of an understanding of the physiology of the ostrich as a domesticated animal.

Some birds, however, are much more responsive to changes than others, so far as the feather growth can be taken as an indication. Thus, the four experimental chicks mentioned, with the exception of that from Clifton, all shew an interruption in the feather which corresponds with the period at which they were placed under the new conditions. The feather growth in the Clifton bird was uniform from beginning to end. Discussing this with Mr. White, he informs me that this particular strain of birds has all along shewn a peculiarly vigorous constitution, and its feathers have been unusually free from bars, and the present experiment certainly bears this out. At the present time, when so much attention is being given to selective breeding in ostriches in order to improve the quality of the feather and eliminate all defects, it is manifest that strains which are naturally vigorous and resistant to defects are of much importance; for quality of feather and constitution of bird will have to go hand in hand to insure permanent success in breeding.

The experiment shews the necessity, not alone of supplying birds with an abundance of food, but also of keeping them free from injuries and parasites in order to secure the best feather production. Also the actual state of health and constitution of the individual bird must be enquired into, as well as the quantity and nature of the food; the feathers of ostriches fed on lucerne are at times as badly barred as those living on ordinary veld, and a good season veld may yield a bad clipping of feathers. All these are matters which call for careful investigation. As in the present instance the same high feeding of two birds may result in both success and failure dependent upon other causes.

CONCLUSIONS.

1. The ostrich is naturally very sensitive to changes in its surroundings or treatment, readily falling off in condition when moved from one set of conditions to another, or changed from one kind of food to another. This falling off tends to produce a check in the feather-growth, and may result in the production of a bar.

2. Different strains of ostriches differ greatly in their responsiveness to such changes, and this should be taken into account in selective breeding.

3. A prolonged low state of health of a bird may result in very imperfect growth of the feathers during the period, independently of any actual check in the growth.

4. For the best feather production the constitution of the bird, its actual state of health, and freedom from injuries and parasites must be enquired into, as well as the quantity and nature of the food.

SOME RECENT IMPORTATIONS OF FRIESLAND CATTLE.

By Dr. Eric A. Nobbs.

There have recently been some notable importations of Friesland or Dutch cattle into the Colony. A feature of special interest has been the increased attention paid to our local requirements, as well as to the three properties which combine to form a profitable cow—points, pedigree and production.

In the past we have had many disappointments, and the enterprising men who have imported have too often found that the animals sent out do not come up to expectation, nor to our ideals of what is wanted.

The value of points lies simply in the fact that experience has shewn that certain external appearances indicate the possession of certain desirable properties. A breed known to possess certain qualities in a marked degree shews certain features which have come to be invariably associated with excellence in this particular direction. Thus the milk veins, milk pits, escutcheon creases and fine texture of the skin are points characteristic of the dairy breeds or of a good milch cow of any sort. The compact frame, short, broad and flat bones and the mossy coat denote early maturity and good fattening capabilities. In this way all recognised good points are only regarded as beauty marks, inasmuch as they indicate the possession of certain desiderated qualities in a marked degree.

Similarly with regard to general conformation, a hollow back is objected to mainly because it necessarily denotes a weak formation, and would be disapproved in a railway bridge or any other weight carrying construction. For similar reasons, well placed legs or a large lung space are considered desirable.

There are good grounds for every recognised point in an animal, and personal fancy unsupported by logical reason is to be suppressed as leading to unprofitableness.

Besides form, outward and inward, the degree or intensity of an animal's specialisation for some particular purpose is to be estimated from the pedigree. The virtue of a pedigree lies first in its length, proving that for many generations the aim of breeding has been along certain fixed and consistent lines, and that no blood of a breed possessing other and perhaps undesired properties has been introduced.

Further, pedigree indicates the ancestry, and thus guides those conversant with the reputations of individual animals, families or strains, and indicates the rank and esteem in which any pedigreed animal is to be held, and the reasonable expectations which may be made of such an animal.

Finally, the pedigree serves as an invaluable guide to the breeder in the selection of mates and the repetition or avoidance of certain characteristics.

Performance is, however, the most convincing test of merit, and a very valuable guide in further breeding. This has been the method upon which the American trotter of world-wide reputation has been evolved. On this fundamental principle the cross-bred dairy herds of Australia have been mainly created.

It is, therefore, with peculiar pleasure that the following information is given, shewing how, in the cases referred to, attention has been given to appearance, as proved by the show ring records, to production, as the accompanying figures testify, while in every case pedigree has been furnished as a matter of course.

The only other possible consideration, the health of the individual particularly as regards freedom from contagious disease, is one automatically secured by inspection before embarkation and at the port of entry.

The particular instances to which attention is now called are the recent importation by Mr. Charles Leonard, of Gloria, of twenty-three heifers and cows from Holland, and to the exhibition at Rosebank Show of six head of the East Friesland breed by Dr. Wegner on behalf of the East Friesland Cattle Breeders' Association. In both instances that very imposing large type of Dutch cow, not unknown in Cape Colony, has been purposely avoided on the grounds that for the maintenance and the full exercises of their powers higher feeding and greater attention is required than for the more hardy if lighter and less exacting type.

Mr. Leonard's purchase, considerable as it is, represents only the latest addition to his herd of pure-bred Frieslands which promises, at no distant date, to become the finest in South Africa.

The most notable prize winners of the year have been secured, the best individuals of the best blood, and the winners of the most searching milking contests. Points, pedigree and productive capacity are thus all represented. Such an importation cannot fail, in the course of a few years, to exert conspicuous and most advantageous influences on the cattle of the Colony.

The information supplied in the attached table is so instructive that it deserves careful study, not merely from the interest of the figures themselves, but as a demonstration of the value and utility of such records.

Comparisons with Colonial standards are difficult owing to lack of data and to the common practice of describing a cow's productive capacity in terms of her best day's performance at the height of her lactation. Our present general daily average is more probably below than above nine bottles. The figures here given, it must be remembered, cover the whole time the cow is in milk, which in several instances is given at over 300 days, in one case 360 days! The daily average of cows of the year 1902 is 4.9 gallons, say 30 bottles, those of 1903, 4.5 gallons, or 27 bottles, and those of 1904 (first calf), 3.08 gallons, or 18.48 bottles. Such average figures are most striking. It is much to be desired that careful watch will be kept to observe what the influence of such complete change as that from Holland to Cape Colony may be, and how these records are affected by the new environment and altered treatment. Later on, the records of the Colonial bred progeny will also prove of exceptional interest to compare with that of their imported dams and grandams, particularly as all the above cows are in calf to some of the most noted sires of the day, and the bulls kept at Gloria are also of the best.

Not only are the above milking records high as regards quantity, but the quality is also good, as shewn by the percentage of fat.

The Friesland cow in the past has not been remarkable for the richness of the milk, but of late, attention has been devoted to the possibilities of improvement in this direction, and it is surprising what has been done by careful breeding and selection in a comparatively short time to increase the butter fat content. Neither quality nor quantity alone is of much account in commercial dairying; it is the happy combination and development of these to the extreme limit consistent with reasonable hardiness of constitution which must be the aim of the practical dairy farmer.

Provided health is not impaired, the cow is to be regarded as a machine for converting so much food stuff into rich milk.

The progress of this importation and of the rest of Mr. Leonard's herd will be watched with interest by farmers all over the Colony.

The eastern portion of the former Principality of Friesland is to-day a portion of the German Empire, and is similar in character to the western portion now included in the kingdom of Holland. A branch of the great family of black and white cattle often described as Friesland, or Dutch, has long been reared here, and with its own stud book and ideals has developed into a distinct breed, though closely allied to those across the border.

The aim has been to produce in the first instance dairy cattle, but with a capacity also for meat production coupled with hardiness of constitution. A very great measure of success has rewarded the exertions of the Society, which was formed in 1883, to carry out this work, and which to-day is the largest organisation of its kind in Germany.

The East Friesland cattle have gained for themselves a world-wide reputation. Not over heavy, and with good walking powers, they are able to travel for their food, but at the same time, with all the indications of milk highly developed, they are capable of a maximum milk-production. Dry cows and oxen fatten readily or make good trek cattle.

For the purpose of ascertaining what opening might exist in Cape Colony for East Friesland cattle, the Breeders' Association in question have sent a representative to this country, and have lately sent out four cows and two young bulls, as already mentioned.

The first cow, Anna, No. 10,098, has a record of 940 gallons, or 5,640 bottles, of milk in 282 days, and yielded 373 lbs. of butter. Another, Ulrike, No. 11,175, gave 1,190 gallons, equal to 7,140 bottles, of milk in 280 days, and 422 lbs. of butter. This is an average of 26 bottles a day for nine months. A third, Elsina, No. 871, gave 930 gallons, or 5,580 bottles, of milk in 272 days, and produced 344 lbs. of butter.

All these cattle, with the exception of the cow bought for the School of Agriculture, Elsenburg, have gone to the Orange River Colony.

Solitary or small importations cannot exercise much influence on the livestock of a district, as the good effect is too restricted to be felt, and too slow to be appreciated. By such good enterprises as these above described, however, especially when animals of the same type are kept together in one herd for some years, an influence is exerted which cannot fail to have most far-reaching results throughout the length and breadth of the land.

Records of Twenty-three Friesland Cattle Imported by Mr. Charles Leonard, of Gloria, Feb., 1907.

Name of Cow.	No in Herd Book.	Year.	Quantity of Milk in lactation period.		Percentage of Fat.	GENERAL REMARKS.
			In gallons.	In bottles.		
Minki II	No. 10751	1901	1404·70	8428·20	3·81	583 lbs. in butter. Awarded 1st prize (10 July, 1906) at Franckie for highest butter record coupled with best appearance From herd of K. N. Kuperus. Cost 1,000 gulden in Friesland £83 6s. 8d.
Bakker II.. ..	,, 11155	1902	1294·26	7765·56	4·02	567·6 lbs in butter.
Zwarte Wassenaar ..	,, 11072	,,	1069·20	6415·20	From 2·45 to 3·25	341 lbs. in butter.
Tietje IX	,, 11358	1903	900·24	5401·44	3·11	301·18 lbs. in butter. 1st prize at Franckie (10 July, 1906) in group class. This milk and butter record was made as a two year old.
Mooie Bonte VI ..	,, 11261	,,	834·02	5004·12	3·71	336·6 lbs. in butter. 1st prize at Leeuwaarden in group class. This milk record was made at two years old.
Delock II.. ..	,, 11325	,,	814·55	4887·30	3·71	330 lbs. in butter. Milk record at two years old. The record of her dam was 1,472·90 gals. of milk, 3·20 °/o fat, 508·2 lbs. butter in 402 days.
Groote Sietski ..	,, 11519	,,	719·18	4315·08	3·34	253 lbs. in butter.
			Quantity of Milk per diem.			
			In gallons.	In bottles.		
Santema II ..	,, 11399	1902	6·49	38·94	From 2·95 to 4·20	
Hiltje	,, 11785	,,	3·41	20·46	3·35	
Jetske	,, 11489	1903	4·73	28·38	From 3·85 to 4·25	1st prize at Franckie (10 July, 1906.)
Groote Sietski ..	,, 11340	,,	4·686	28·116	,, 2·7 ,, 3·5	
Grutje II	,, 11732	,,	4·62	27·72	,, 2·7 ,, 3·4	The record of the dam of this cow was 1,584·22 gals. of milk, 3 % fat, 309·30 butter in 286 days.
Anentje II ..	,, 11445	,,	4·18	25·08	3	
Anna II	,, 11812	1904	4·29	25·74	From 2·70 to 4·40	
De Hoop XI ..	,, 11770	,,	3·784	22·704	,, 3·05 ,, 3·70	1st prizes at Franckie and Leeuwaarden.
Jantje XI.. ..	,, 11633	,,	3·542	21·252	,, 2·85 ,, 3·50	
Jeltje II .. .	,, 11769	,,	3·476	20·856	,, 2·9 ,, 3·4	
Lutske III ..	,, 11811	,,	3·41	20·46	,, 3·05 ,, 4·35	
Anna I	,, 10408	,,	3·19	19·14	,, 2·7 ,, 4·15	
Umkje	,, 11768	,,	3·135	18·81	,, 2·85 ,, 4·25	The record of the dam of this cow was 984·04 gals. milk, 3·65 °/o fat, 389·4 lbs. butter.
Jantje Nooitgedacht..	,, 11771	,,	3·102	18·612	,, 3·3 ,, 3·8	1st prizes at Franckie and Leeuwaarden.
Jantje XIII ..	,, 11753	,,	3·08	18·48	,, 2·45 ,, 3·80	2nd prize (10 July, 1906) at Franckie in family of three head.
Atke	,, 11813	,,	2·915	17·49	,, 3·0 ,, 4·45	

BOTS OR "PAAPJES."

By D. Hutcheon, M.R.C.V.S., Director of Agriculture

As I am continually receiving requests from farmers and horse-owners to give them a cure for "Bots" in horses, the following article is republished with slight alterations for general information:—

Bots or Paapjes are the larvæ of various species of the gadfly. "These flies are generally included in the genus *Œstrus* of entomologists, the *Œstridæ* forming a rather numerous family of insects, and belonging to the order *Diptera* or two-winged insects. Although most of these insects, from the obscure nature of their mouths, are probably incapable of taking nourishment when in their perfect state, they are nevertheless amongst the greatest pests to cattle in their larval state. During this period of their existence they are all parasitic upon different species of ***herbivorous*** mammalia, some of them living in the skin and others in the internal cavities of their hosts." I have not seen the larva of the bot-fly of the ox (*Œstrus bovis*) in this Colony except on cattle imported from Europe; but anyone who has lived in Europe will be familiar with the excitement produced amongst a herd of cattle by these flies in the summer time, how they will rush about with tails erect, in the vain attempt to get away from their tormentors. "The female fly perforates the skin by means of the ovipositor, and deposits one egg in each opening. After a time the egg is hatched, and the larvæ, during growth, produce sufficient inflammation to lead to the well-known *warbles* seen on the backs of cattle."

The larvæ of the "bot-fly" of sheep and goats, which are found in the sinuses or cavities within the bones of the face, communicating with the nasal chambers, are frequently met with in this Colony, and were referred to in the *Agricultural Journal*, vol. xiv., No. 10, p. 667. Numerous larvæ of another species of fly were found in the skins of the Angora goats which were imported from Asia Minor, but they do not appear to have bred here. Every effort was made to destroy the whole of the larvæ found on the more recent importations, but I was informed by goat farmers who had experience with the former importations, that although very little attention was given to the destruction of these larvæ, the flies never appeared. It is very probable that as the larvæ which are found on animals imported from Europe complete their larval stage in the skins of their hosts at the beginning of our winter, instead of the beginning of summer as in Europe, the climatic conditions are not favourable to their evolution into the perfect fly, and the propagation of their species after they have completed their development.

There is a large number of species of these bot-flies which infest different regions of different species of herbivorous animals. In South Africa, their larvæ are found in the skins of many species of antelopes. Even in the horse there are several species which are found to infest different parts of the intestinal canal, but the common bot-fly of the horse—*Œstrus equi* or *Gastrophilus equi*—is the species of greatest interest to the Colony. This fly, unlike the flies which attack cattle and sheep, in depositing its eggs on the hair of the horse, appears to cause the animal no irritation whatever. From my observations in this Colony, the eggs of this fly begin to be deposited upon the horse's hair about the beginning of January, but the exact time may vary a little in different parts of the Colony. The eggs are attached to the hairs of the horse by means of a glutinous material which is secreted along with the egg. If a hair having an egg attached to it is placed under a low power of the microscope, the glutinous material will be observed to surround the hair, making it appear as if the hair passed through the outer covering of the egg. Anyone can verify the fact that it is most difficult to remove these eggs from the hairs.

The parts of the body of the horse upon which the eggs are principally deposited are in front of the chest, behind the shoulders, and on the inside of the fore-legs.

Cobbold says:—"When from any cause the horse licks those parts of his coat where the eggs have been deposited, the moisture of the tongue, aided by warmth, hatches the ova, and in something less than three weeks from the time of the deposition of the eggs, the larvæ make their escape. As minute maggots they are next transferred to the mouth, and ultimately to the stomach of the equine bearer, along with the food and drink. Of course, a great many larvæ perish during this passive mode of immigration, some being dropped from the mouth and others crushed in the food during mastication. It has been calculated that scarcely two per cent. of the larvæ of the hundreds of eggs deposited on a single horse arrive within the stomach. Notwithstanding this waste, all of us are familiar with the circumstance that the interior of a horse's stomach may become completely covered with the larvæ in the condition of bots. Whether few or many, they are contained in this singular abode chiefly by means of two large cephalic hooks, which are inserted into the mucous membrane. As soon as the bots have attained their perfect growth, they voluntarily loosen their hold and allow themselves to be carried along the alimentary canal, until at length they make their escape with the fæces. When transferred to the soil they bury themselves beneath the surface in order to undergo the change whereby they are transformed from the bot state into the pupa condition." "After they penetrate the ground or remain concealed in the excrement, their movements cease. After twenty-four to forty-eight hours they assume a bright-brown tint, then a dark-brown, almost black colour; the skin becomes hardened, and forms a shining shell (pupa case) in which the nympha is enclosed'' (Neumann). After having remained in the soil for a period of six or seven weeks, they finally emerge from their pupal envelope or cocoon in the active life phase of the imago or perfect dipterous insect.

If anyone will take the trouble to pick up a number of bots as they pass from a horse, and place them in a tumbler containing a mixture of fine earth and horse-dung, he will find that in about six weeks' time the flies will make their appearance. The earth in the tumbler must not get too dry.

It thus appears that these creatures, in the form of bots, ordinarily pass about nine months of their lifetime in the digestive organs of the horse.

Soon after the flies have effected their escape from the cocoon, operations are made for the propagation of their species, and as they are neither furnished with a mouth, nor other means of taking in nourishment, it is obvious that the pleasures they enjoy during the winged state must be exceedingly short-lived.

Such is a brief description of the life-cycle of the creatures called bots.

I have already remarked that the eggs of the bot-fly begin to make their appearance upon the horses' coats about the beginning of January, the deposition continuing till about the end of April. If, then, we allow three weeks from the time of their first appearance on the horse until the first larvæ arrive at their destination, the period during which the larvæ are taken into the horse's stomach in greatest abundance would be from about the beginning of February to the end of May. On horses running constantly on the veld, the eggs may be even observed for a longer time. If, then, we accept the statement as approximately correct that the larvæ require from eight to nine months to complete their larval or bot stage in the horse's stomach, the oldest bots would be ready to leave their confinement about the beginning of October, and continue to be passed until about the month of February following. A purgative of any kind given to a horse during these months will bring away living bots. It will thus be seen that the stomach of a veld-fed horse in this Colony is rarely completely free from bots, a statement which I am able to verify from numerous *post-mortem* examinations conducted at all times of the year.

THE SITUATION OF THE BOTS IN THE HORSE'S STOMACH.—A great deal of misunderstanding with reference to the amount of injury which the bots inflict upon a horse's stomach arises from the fact that so few non-professional men are acquainted with the normal appearance which it presents. When a horse's stomach is opened, one is at once struck by the different appearances presented by its internal membrane, according as it is examined to the right or left. To the left, where the œsophagus enters, the lining membrane has a pale white appearance, is firm and resisting to the touch. This white resisting lining terminates in the centre of the stomach by a distinct wavy ridge. To the right of this ridge, the lining membrane is of a purplish or reddish brown colour, very vascular, and appears inflamed looking when compared with the white lining membrane of the left side. It is this division of the mucous membrane which lines the stomach of the horse, into two distinct portions, that has led amateur anatomists astray; they naturally expect to find it of one uniform colour and character.

I have observed this anticipation at every *post-mortem* examination of a horse which I have made in the Colony.

On cutting open a horse's stomach, emptying and clearing it, so as to exhibit its general appearance and the position which the bots occupy, it is very rare that someone amongst the bystanders does not call out, "There you are! Don't you see that the bots have eaten off half of the lining of the stomach?" They observe the bots sticking in a close cluster on the white membrane which lines the left or gullet-end of the stomach, and on comparing this part of the stomach to the other part which terminates in the intestines and has a pinkish raw appearance, exactly as if the white lining had been torn off from it, the conclusion arrived at—and a very natural one—is, that the bots have already eaten off the white lining on the right end of the stomach, and are about to commence operations of a similar character on the left.

Another source of error is the fact that each bot pierces a small hole, about the size of a large pin-head, into the white lining membrane of the stomach. Some authors state that these little holes become deeper and larger, the longer the bot remains attached; but in my observations, which have been fairly extensive, this statement appears to refer mainly to the period of the growth of the bot from its attachment to the mucous lining of the stomach until it has attained its full size, and merely corresponds to the increased size of the head and hooks of the bot. During this period also the epithelial covering of the mucous membrane becomes slightly thickened by the constant slow irritation which the bots produce by the insertion of their heads in it. If the bots are pulled off, that part of the lining membrane to which they were attached in clusters presents the appearance of a sieve when looked at from above, but unless the *post-mortem* examination is delayed for some time after the animal died, I have never seen any of these holes pierced right through the walls of the stomach as has been so often stated by other observers. If, however, the *post-mortem* examination is delayed, even for an hour or two, these holes, made by the bots, will be found much larger, and many of the bots will have burrowed in between the mucous and muscular walls of the stomach, and some of them may actually have pierced right through the walls of the stomach. But it will be observed in all such cases, that there is no inflammation about these enlarged holes, which there would be were they made during the life of the host. I have frequently demonstrated this to the farmers when occasion offered, by opening the abdomen of a horse immediately after death, then laying open the stomach and removing one-half of the cluster of bots from their attachment, closing the stomach and the abdominal walls again, and leaving the carcase for two or three hours longer—after which the stomach was removed and examined, and the holes in the part where the bots were removed immediately after death, compared with the holes in the part where the bots were allowed to remain for some hours longer, when the latter would invariably be found much larger than the former, irregular in shape, and many of them run into one another, while, as already remarked, some of the bots might be found under the mucous membrane, and in other irregular situations. I had a most favourable opportunity of observing and demonstrating these facts during the last epizootic of horse-sickness in 1891-92, when large numbers of horses were dying within a limited area, and *post-mortem* examinations purposely made at varying periods after death. But during the whole of that time I never met with a single case in which the bots had anything directly to do with the animal's death, nor anything to indicate that these irregular holes so often spoken of, were made by the bots before the animal died. My experience clearly shews that the bots do not move from their original attachment, or attempt to change their position until they have completed their larval state, and are ready to quit their host entirely along the digestive canal with the fæces.

Another error, which I have seen more than one farmer make, is to mistake the hole made by cutting off the stomach from the œsophagus for a hole pierced by the bots. This misconception arises from the fact that the bots are very often clustered immediately around the entrance of the gullet, or œsophagus, into the stomach. When the stomach is thus cut out, as usual, by cutting off the gullet close to the stomach, and the stomach is afterwards opened carelessly, that opening made by cutting off the œsophagus is frequently mistaken for an opening eaten through by the bots, since a few bots will generally be found on the outside of this hole, and others in the act of passing through it.

Do Bots Interfere with a Horse's Health and Condition?—It is hardly possible for anyone who opens the stomach of a horse and finds from forty up to as many as four hundred bots in it, not to come to the conclusion that the bots must seriously interfere with the animal's digestive powers, and consequently in a corresponding degree affect his general health. Yet, if we consider the nature of the bots, their situation in the stomach, and the character of the membrane to which they are attached, we will be convinced that the direct harm which they produce is very much exaggerated.

With regard to the bot itself, the amount of nourishment which it requires must be very small, as it subsists on the products secreted by the small wound in the mucous membrane. It certainly has to develop from the minute larva to the mature bot, but that process occupies many months, and, from the nature and simple structure of the creature, the amount of tissue change which takes place during its growth must be very small indeed. The total amount of nourishment, therefore, which even four hundred bots would require per diem during their temporary residence in the stomach of the horse, would not be so much as could perceptibly affect the nourishment of an ordinary fed horse. But the question will naturally be asked:—Admitting that the total amount of nourishment which the bots themselves require may be very small, do they not seriously interfere with the horse's digestion, by destroying the healthy functions of the membrane to which they are attached? To this I would reply that the effect upon digestion is not nearly so much as is at first sight apparent. I have already shewn that the portion of the stomach to which the bots are attached is lined by a strong white mucous membrane, which contains no gastric glands, and is covered by a thick layer of epithelium, an insensitive membrane which contains neither blood-vessels nor nerves, and thus protects the vascular membrane underneath from irritation or injury. Bots do not, therefore, interfere directly with the gastric digestion of the horse. It is the other end of the stomach which contains the gastric glands and which performs the whole of the digestive process carried on within a horse's stomach.

The only direct injury, therefore, which the bots can inflict upon a horse, so long as they remain attached to their normal position in the stomach, apart from the little nutriment which they imbibe, is simply one of mechanical irritation; but even this can amount to very little. The larva attaches itself to the mucous membrane by its two cephalic hooks as soon as it arrives in the stomach, and there it remains until it arrives at maturity and begins to make arrangements for quitting its host.

I am quite ready to admit that when any of the different species of bots which infest the horse, attach themselves in irregular situations other than the left or cardiac end of the stomach, they may be the cause of serious mischief, and even of the death of the animal. For example, cases have been reported where a few bots have attached themselves to the region of the throat about the larynx, giving rise to violent coughing, and difficulty in breathing. Other cases have been recorded in which a number of bots have been found attached to the œsophagus, immediately above its termination in the stomach, as the mucous membrane there presents the same characters as it does in the left side of the stomach. While a certain number of bots may be found occasionally on the delicate mucous membrane of the right side of the stomach, in the duodenum, and in the rectum, but a close examination will clearly shew that the bots found in the latter situations are only recently attached, their heads not being imbedded in the membrane. It is evident, therefore, that the bots found in such situations have only temporarily attached themselves on their passage out of their host. With respect to those found about the throat and œsophagus, it must be comparatively rare to find them in these situations, because during all my experience in the Colony I never met with a single case.

After discussing the different opinions expressed by various authors respecting the harm which these bots inflict on their host when confined to their natural attachment on the left half of the stomach, Neumann says: "When we reflect on the extreme frequency of the gastric larvæ, the multitudes of horses which are infested with them, their frequently being present in enormous numbers in a stomach, and the impossibility of even suspecting their presence there during life, owing to the absence of any apparent disturbance, we might be led to consider these parasites as altogether inoffensive. What is more, some authorities have ascribed a stimulating action to them, which is of advantage to the digestive functions; but in this there is manifest exaggeration. We cannot admit that the numerous ulcers (small holes) produced on the surface of the œsophageal and gastric (?) mucous membranes are a matter of absolute indifference." To this opinion I subscribe; but what I want particularly to draw attention to is the fact that there are no definite or diagnostic symptoms to indicate the presence of even a large number of bots in the stomach of a horse, so long as they remain attached to the mucous membrane of the left side of the horse's stomach, and that is the position which they usually occupy. Hence it is evident that the numerous diseases and varying symptoms to which bots are believed to give origin to in this Colony is not founded on accurate observation, but much is manifestly due to the imagination. I will describe some of these diseases in future articles.

With respect to the treatment for bots, the only satisfactory treatment is *preventive*: either to keep the flies off the animals by frequent dressings of acrid and bitter substances, such as decoctions of walnut tree leaves, tobacco, aloes and assafœtida, or to remove the eggs by frequent careful grooming. None of these preventive remedies are capable of being applied to semi-wild horses which graze on the veld, but either of them, especially the latter, may be carried out on horses in daily use.

There are a great many recipes which are highly extolled for the expulsion of bots in this Colony. One of the most popular is the following:—Fast the horse for twenty-four hours, then give him a pound of brown sugar dissolved in a quart of milk. Bots are believed to be very fond of sugar, and there being no food in the stomach the bots let go their hold of the lining membrane, and revel in the saccharine fluid. After giving the bots an hour or two to gorge themselves in this manner, a bottleful of strong tea is given to the horse;

this is supposed to stupefy the bots so that they are unable to re-attach themselves to the mucous membrane. When the tea has had sufficient time to effect its alleged purpose, a bottleful of cocoa-nut oil is given to the horse, and this expels the bots from the stomach. This is a beautiful theory, but unfortunately it does not stand the test of practical experiment. I have tried it, carrying out the instructions carefully, keeping the horses under close observation and killing them from seven hours to fourteen days after the dosing, and the effects, so far as the removal of the bots from their attachment in the stomach was concerned, were nil. It must be borne in mind that during the spring and early summer months, when the bots have completed their larval stage and are ready to quit their host, that any purgative medicine will invariably bring away a number of bots with the fæces, but there is no medicine that I know of that can be relied upon to bring away bots until they are ready to move of their own accord, at least not in the strength that can be given with safety to the horse. Carbolic acid, chloroform, bisulphide of carbon, benzine, and similar remedies have all been tried, but with indifferent success. It is fortunate, however, that they come away spontaneously after completing the larval stage of their existence, so that the stomach is relieved for a short time annually.

THE WOOL TRADE OF THE CAPE.

A PLEA FOR PUBLIC SALES.

At the ordinary meeting of the Wodehouse Farmers' Association, held at Dordrecht on Saturday, April 6th, Mr. G. E. Dugmore, M.L.A., read the following paper on "Wool":—

As an old resident in the district and one who has always taken an interest in its advancement and prosperity, I thought I should like to read a paper before the Wodehouse Farmers' Association, on a subject which is of immense importance to sheep farmers, and which has always appealed to me as a matter commanding less attention than it deserves.

At the same time I feel that in venturing to give my views on a subject upon which my audience are likely to be much more informed than myself, I lay myself open to be reminded that "Fools rush in where Angels fear to tread."

However, I believe that a full and free discussion of the subject can do nothing but good—and may lead to more thought and effort being devoted to the improvement of one of our staple industries—the growing of good wool.

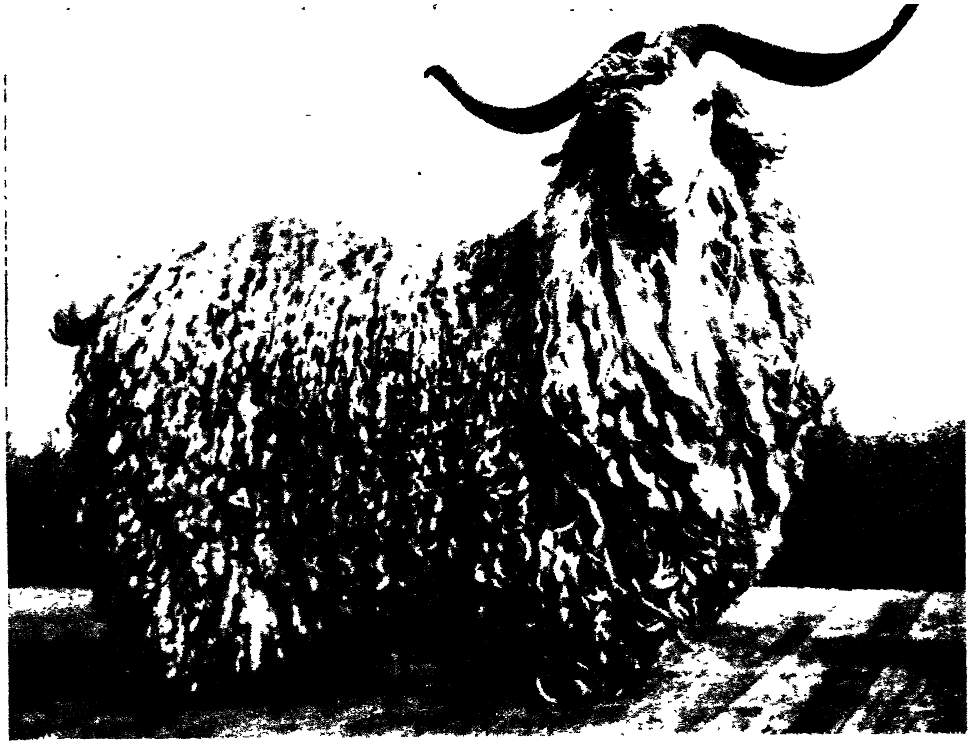
In this Colony there are great diversities of soil, climate, rainfall, pasturage, and as a result of this, entirely different methods of farming are required to meet the varying conditions. In the Western districts the soil and climate are suitable for the production of fruit, wine, wheat and oats—the pasturage is poor and scanty, and stock can be kept alive only by artificial feeding.

In Oudtshoorn we find that on a rich Karoo soil, lucerne flourishes, and supports immense herds of ostriches, while tobacco is perhaps the next most profitable product of the soil.

In the Midlands we find the Angora goat attains the highest perfection in regard to quality of mohair, while ostriches, cattle and sheep also do well.

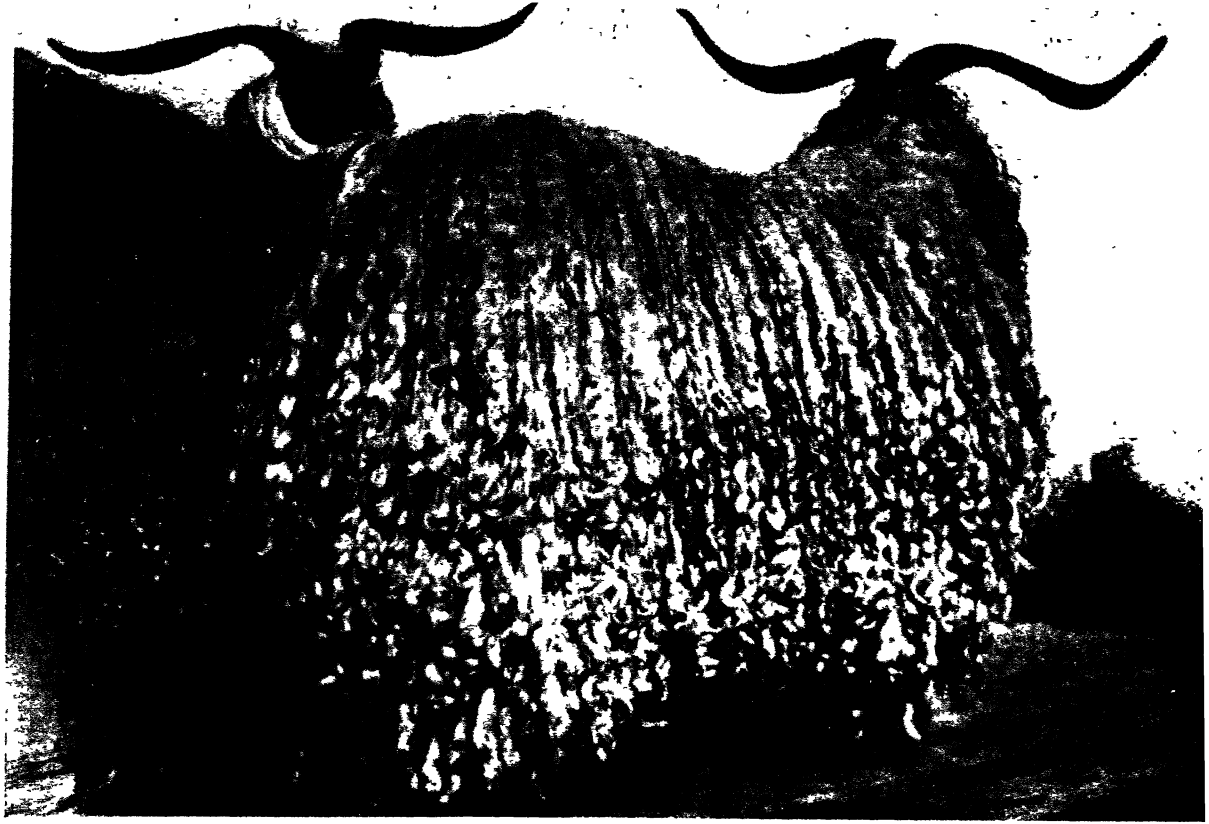
Coming farther east, and taking a line roughly from Albert through Tarkastad and Cathcart to the coast, we have a good grass country right away to the Natal border, where cattle and *par excellence* the merino sheep do well, and yield good profits.

I think it is patent to all who are keeping their eyes open that in the Colony, though we have lagged behind other countries, we are at last beginning to make a move in the direction of improved methods;



THE 1907 CHAMPION ANGORA RAM.

This magnificent animal, the property of Mr. R. Cawood, may be designated the Champion of the year, for he was awarded that honour at King William's Town, Cradock, Graaff Reinet, Grahamstown, and Port Elizabeth. This Ram is 4 years and 8 months old, and was shorn on Dec. 4th, 1905. His sire was "A8," and his dam "253." He also took many firsts in the full mouth classes.



Back view of Mr. R. Cawood's Champion Angora Ram, showing the wealth and quality of the fleece.

TOBACCO WILT IN THE KAT RIVER VALLEY.

The following report on Tobacco Wilt in the Kat River Valley has been forwarded to the Director of Agriculture by Mr. I. B. Pole-Evans, Mycologist to the Transvaal Government:—

I have the honour to present you herewith with an account of my visit to the Kat River Valley in connection with the Tobacco Wlit trouble.

Before leaving Cape Town, I gave you clearly to understand that I could not undertake such a thing as a proper investigation of the trouble owing to pressure of work in my own Colony; and, further, I pointed out that from the lateness of the season I saw little hope that this visit of mine could elucidate the matter.

As I surmised, my visit was made much too late in the season. From information gained from the tobacco growers in the districts, I learnt that the disease is at its worst towards the latter part of November and beginning of December, whereas I was in these parts during March 23rd-26th.

FIELD OBSERVATIONS.

At Cookhouse Junction, Mr. Dewar, the Eastern Province Entomologist, met me and conducted me to the most important tobacco farms. The first place visited was that of Messrs. Tidbury Bros., Ebenezer West. They estimated that they had lost about 5 per cent. this year through *wilt*.

We examined a large plot of tobacco and found a number of diseased plants. These plants had attained the normal height and size of healthy plants, growing alongside, but exhibited a marked wilting of the foliage. In most cases the leaves were very yellow in colour, indicating that the plants had been affected for some little time.

Slightly sunken, brown to black patches and streaks were visible on the stems, and on cutting them through at these spots, corresponding necrotic patches were to be found in the pith. In every one of these plants that we examined we found the "potato tuber moth grub," and always a certain amount of rotting of the root system. Healthy plants growing alongside shewed no evidence of the grub or root-rot. The biggest piece of ground that the plants were on, was formerly an old sheep kraal, so Mr. Tidbury told us, and he was under the impression that the plants which were growing on the heavily manured portion were much more affected with the disease than plants growing alongside on a virgin piece of soil.

The next place visited was that of Mr. A. J. Green, Balfour. Here we examined a large number of plants, both wilted and healthy. In every one of the wilted plants we found the burrows in the stalk made by the grub, and in most cases one or more grubs were present, and I felt quite convinced that the insect must in some way be connected with the disease.

The same afternoon we examined some more tobacco plots belonging to Mr. Green, and in all the older plants, which shewed signs of wilt, we found evidence of the grub. However, in a patch of plants which had been planted out later than the rest, I came across a case of wilting which at once struck me as suspicious and distinct from the wilt which we had hitherto met with. The plants, sometimes as many as twenty and even more in a row, had wilted simultaneously and consecutively. In a few of these we found the grub, but in many we failed to find a trace of it. A section across these plants revealed a distinct brown discolouration of the bundle system. It should be mentioned that all these wilted plants were growing in positions certainly unfavourable. In most cases they were standing in pools of water, six to seven inches deep, while the soil around was water-logged. In the same plot where the ground attained a gentle slope and was well drained, no such wilting was evident. From this, I was inclined to think that the wilt in this case was due to the drowning of the plants.

The following morning we went over to Mrs. Davies's farm. She is the largest tobacco grower in Balfour. From Mrs. Davies we learnt that the plants which were sown in October suffered severely from the wilt during the first and second week in December. She estimated that she had lost 25 per cent. of these plants, whereas plants sown later in the season were reckoned to have shewn a percentage of one in a thousand.

Mrs. Davies was of the opinion that covering up the beds with canvas was decidedly beneficial.

We went through the plots and examined the few that were still uncut. All the plants which had evidently succumbed to the "wilt" were in an advanced state of decay, and in every case shewed a certain amount of root rotting. In every one of these plants it was plain the grub had been at work.

From Mrs. Davies's farm we journeyed to Mr. Van Wijk's, at Fairbairn. Here we saw no young plants shewing a typical wilt, but all old ones. At this place Mr. Blinkinsop declared that the grub was not the cause of the trouble, but that a root-rot was to blame. All the plants that he shewed us were far too decayed, and the roots too rotten for us to assign any cause. The root system of these plants was saturated with moisture, and poorly developed. In every one of these plants we found evidence of the grub. As far as his experience goes, Mr. Blinkinsop told me that the plants had died out intermittently.

Mr. Raubenheimer's farm, near Seymour, was the next place visited. Mr. Raubenheimer was, unfortunately, away, but his son told us that they had had the disease worse this year than last. There were very few diseased plants at the time of our visit, but the frequent gaps in the rows told their own tale; what few diseased plants there were, were in a very advanced state of decay. Grubs were in all the plants we examined, and gall worms had disfigured the root system in nearly every case.

Laboratory Observations.

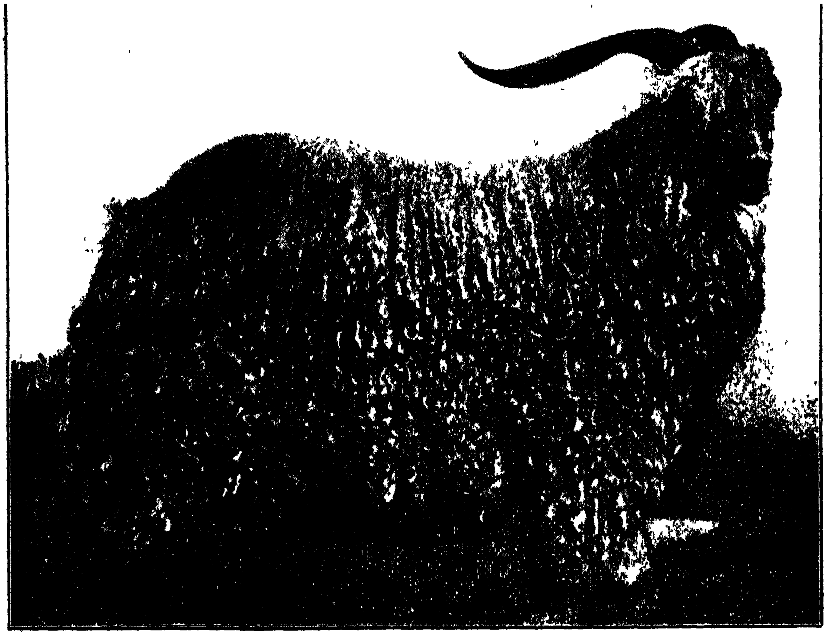
I brought away with me to Pretoria a number of diseased plants, and have now completed a rough and ready microscopic examination of their tissues (by means of hand sections). In the stem portion of the plants I could find no fungi or bacteria, but in the diseased roots I found a sterile mycelium. The hyphal filaments in all the plants examined present the same morphological characters, and I have little doubt that it is one and the same fungus present in all the roots examined.

Just as to what are the exact relationships between this root fungus, the wilting of the plants and the injuries produced by the potato tuber moth "grub," I am not in a position to say. I can only say that the root system of diseased plants is invaded by a parasitic fungus. Whether this fungus is the cause of the wilt, or whether it attacks plants after they have had their vitality weakened through some other cause, will require a detailed investigation lasting over at least one complete season at the hands of a well-trained plant pathologist stationed on the spot.

THE AGRICULTURAL SHOW SEASON.

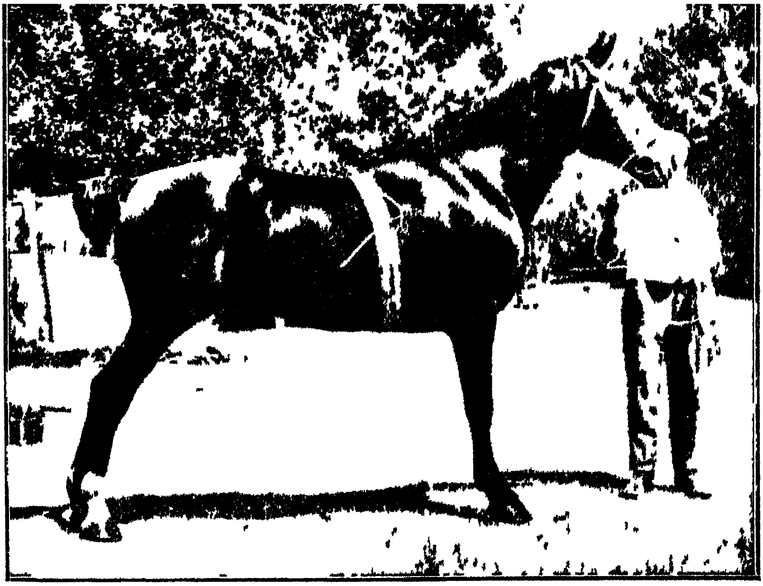
The month of April saw the close of the Show Season of 1907, and, speaking generally, it may be fairly described as one of the most encouraging seasons this Colony has known. Not only have we put up a record for the actual number of Agricultural Shows held in the Colony, but these shows taken as a whole, received a remarkable share of public support. The Western series was dealt with in a former issue, and there it was shown that in spite of the abnormal number of fixtures they all did something towards adding to the general interest which is now growing so rapidly in agriculture and agricultural pursuits in this Colony. The Eastern Province and the Midlands managed to arrange for an even larger proportion of these exhibitions this year, and, we are pleased to state, they also received a full measure of public support and countenance. On the Border line shows were held at King William's Town, East London, Barkly East, Aliwal North, Dordrecht, Queenstown, Cathcart, Molteno and Peddie, while in the Transkeian Territories, Kokstad, Matatiele, and other centres succeeded in putting forward exhibitions of the resources of the various districts which were exceedingly gratifying. In the Midland districts the agricultural shows are always a strong feature, and this season they were better than ever. These included Graaff Reinet, Cradock, Grahamstown, Port Elizabeth, and a couple of other minor fixtures. While as far north as Mafeking success has also to be recorded.

It will be seen from the above that our Agricultural Show system is growing into formidable proportions for if these be added to the fixtures at the Western Province our shows totalled this year very nearly forty in number. It speaks well for the community that each of these can be held and command support, not only from visitors, but from exhibitors as well. For when we come to consider the limitations of the agricultural industries of this Colony it does not appear, on the face of it, that we could honestly support so many ventures of this description. Of course the truth of the matter is that the local Agricultural Show is gradually becoming grafted on the local traditions and so long as this continues we may expect to see the local shows flourish. That they serve a good purpose in many ways is shown by the increasing competition at the more important centres. One can take any of the latter held this season and important improvements are noticeable. On the Border there is undoubtedly a growing feeling of emulation among the more enterprising farmers, particularly in their stock, and this was

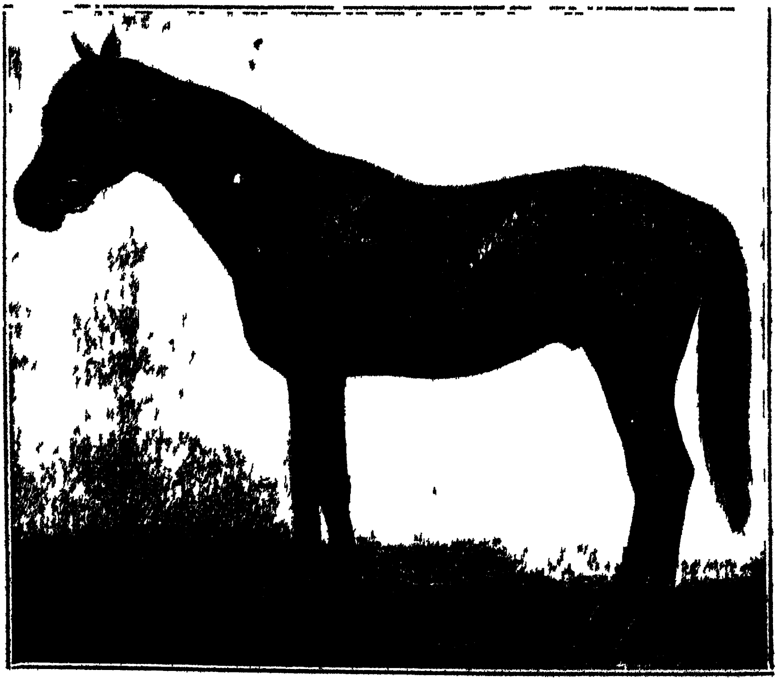


First Prize 6-tooth Angora Ram, at Port Elizabeth, the property of Mr. R Cawood

Mr. M. Gadd's Grey Arab Stallion, "Saharoni," bred by Sir Alfred Pease. A First Prize winner at Port Elizabeth.



Hackney Stallion, "Royal Standard," recently the property of Mr. James Gray, of Ceres, 1st at Port Elizabeth and Rosebank and a prize winner in Europe and America. This horse was purchased at the Port Elizabeth Show by Mr. Arthur Forbes, the noted breeder of Hackneys of Temple Farm, Schoombie, in the Middelburg District



Thoroughbred Stallion, "Victor Don," the property of Messrs. Orpen & Son, of Barkly East; 1st at Port Elizabeth in class for Stallions for breeding Remounts and Riding Horses reflected during the Show season just closed. It is safe to conclude therefore that the smaller shows serve a good purpose, for many of the best exhibits come from those districts where the local show is a strong feature.

Another point which is gradually forcing its way to the front is the manner in which these various societies are extending their spheres of usefulness. In their prize schedules they now include many articles which were not dreamed of a few years ago. We find, for instance, the Eastern and Midland Shows which used to confine themselves largely to stock and implements, with animal products, now offering encouragement to fruit-growing, and even home industries are receiving more and more attention. At Port Elizabeth, for instance, this year, the fruit exhibits were one of the most attractive sections of the show. And again this Society, at the instigation of a few local enthusiasts, have got out a complete outfit, with a suitable tent, to demonstrate the whole art of bee-keeping. The lectures delivered daily in this tent by Mr. John Martin, were attended by interested audiences, and it is impossible that seed thus sown will all fall on barren ground. The movement in favour of these minor industries has only just begun in this Colony, but it has such a promising future that it should certainly be pushed as much as possible. The lack of interesting occupation makes many a farmer's family tire of the life of the farm, but with home industries established, which would not only break the monotony but "bring grist to the mill" as well, life would be all the brighter for a large proportion of our population. The smaller agricultural societies could do a great work for this country by laying themselves out to encourage these minor industries among the farmers and their families. Their only task would be to find out which would best suit the conditions of their districts and be most likely to bring the best returns.

Even in agricultural shows history very often repeats itself. Port Elizabeth has been acknowledged for years past the great trial ground for most of the leading competitors, and this year proved no exception to the rule. Again we have to record a success which is almost phenomenal, for this centre manages year by year to so arrange its annual exhibition that not only is the large population of that important seaport fully interested and attracted but the farming population from every part of the colony seems to flock there to take part in the annual festival. One reason for this is, we believe, the prominence which is always given at Port Elizabeth to the great natural industries of the Colony. One can invariably rely upon seeing at Port Elizabeth most that is best in the country in the shape of woolled sheep, Angora goats, and ostrich feathers, if not the birds themselves. In horses and cattle too, there is always a most representative assembly, and though the former class this year was not so brilliant as it has been, the latter more than made up for this. But in merino sheep and wool, in Angora goats and mohair, the exhibit was probably the finest ever seen in this Colony. In no other Showyard in the Colony can one realise so fully and so forcibly how much we owe to our great animal industry, and how important a part the stock farmer plays in our national economy. The liberal accommodation provided was tried to its utmost, so great was the number of competitors in every section, and had the horse classes been as fully filled as in previous years the huge yard would have been crowded. But with the De Beers and other studs un-represented, owing to unforeseen difficulties, there was a little space available here.

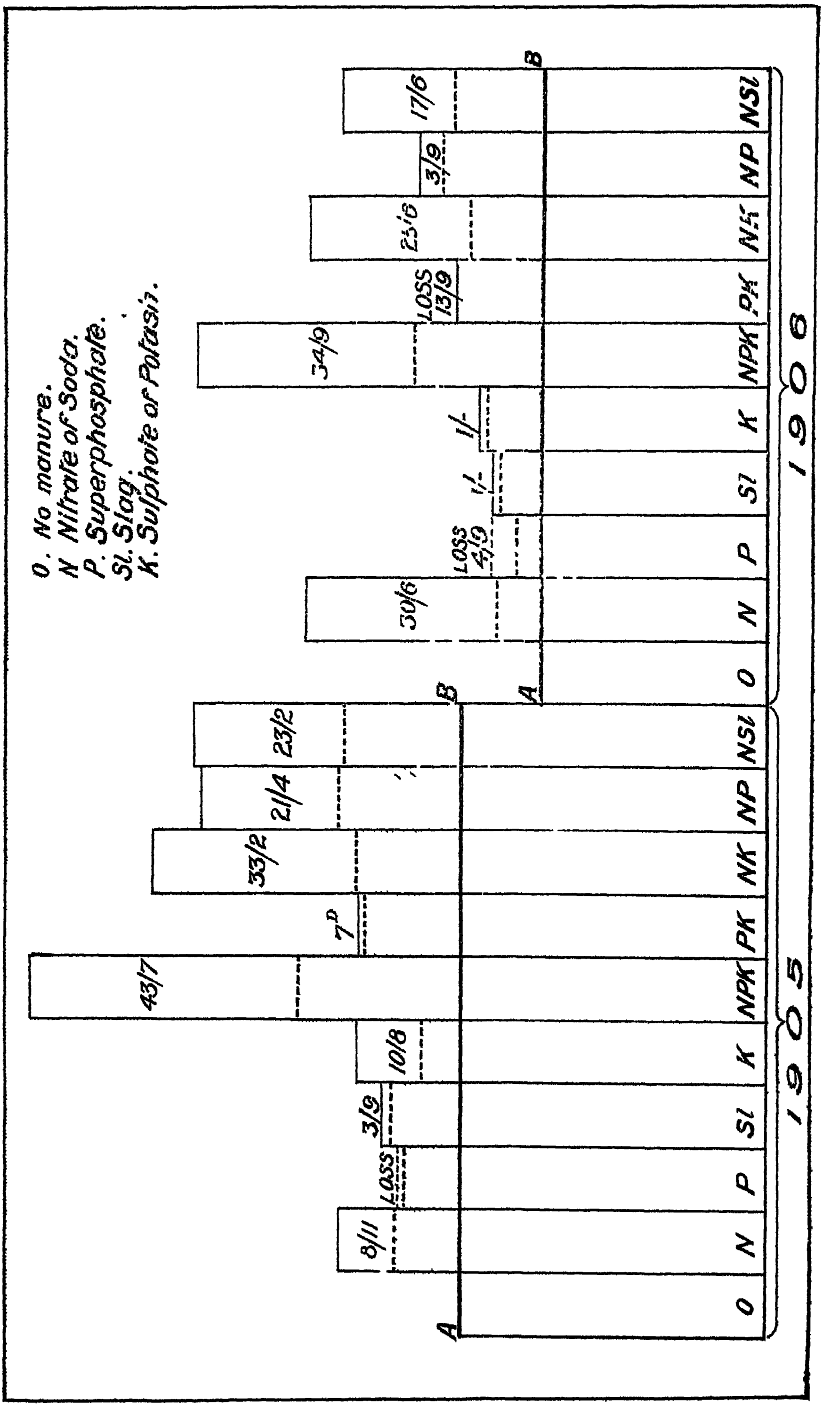
Another exceedingly strong feature was the magnificent display of implements, machinery and manufactures. The implements and machinery are almost bewildering in their profusion, and each year the space occupied by this valuable section seems to be more and more interesting. Among the many attractive features the machinery shewn in motion is one of the most valuable. It may not be so educative as actual tests under specified conditions would be, but it is the nearest approach to such trials we have so far in this Colony. The large array of local manufactures too are an educative factor as they shew in a convincing manner what it may be possible some day to produce here when the conditions are more favourable.

MANURING OF OATHAY AT ELSENBERG COLLEGE.

By J. Noble Jack, Principal of Elsenberg Agricultural College.

The experiment here briefly reported on, is the continuation on the same plots of our 1905 one (see *Agricultural Journal*, April, 1906). The past season was an exceptionally dry one and therefore unfavourable to artificial manures of every kind. The yields as might be expected on such soils were less than in 1905 but from the point of view of scientific enquiry—the main object of the experiment—the differences between both seasons are very minor, and can be satisfactorily accounted for. The most important practical point is that on poor soils like ours at Elsenberg, a well-balanced complete manure is the most profitable to use.

The prices paid for the manures were Nitrate of Soda 7s. 6d, Sulphate of Potash 12s. 6d, Superphosphate 3s. 6d, Basic slag 3s. 6d, all per 100 lbs. Government Guano used in some added plots ran to about 6s. 3d, per 100 lbs. or less than half what the ingredients cost in commercial fertilisers.


0. No manure.
N. Nitrate of Soda.
P. Superphosphate.
Sl. Slag.
K. Sulphate of Potash.
A
B
8/11
LOSS
3/9
10/8
43/7
7D
33/2
21/4
23/2
O
N
P
Sl
K
NPK
PK
NK
NP
NSl
1905
A
B
30/6
LOSS 4/9
1/-
1/-
34/9
LOSS 13/9
23/6
3/9
17/6
O
N
P
Sl
K
NPK
PK
NK
NP
NSl
1906

In the accompanying illustrations the total yields are represented by columns drawn to scale. From the foot of the page to the lines marked A—B the space represents the crop produced without any manure, the portion of the column above this line indicates the total increase and the part below the dotted line the amount of the yield required to pay for the manure. Above the dotted line stands for clear profit.

TABLE I. – Shewing Results obtained in Marton Camp, 1906, on Plots exact duplicates of 1905; all figures being per acre :—

Plot.	Treatment.	Produce.	Increase.	Value of Increase.	Cost of Increase.	Profit.
		lbs.	lbs.			£ s. d
	Average of 4 unmanured	900	..	..	..	..
1	100 lbs. Nitrate of Soda ..	1,850	950	38/-	7/6	1 10 6
2	248 lbs. Superphosphate ..	1,000	100	4/-	8/9	.. *
3	200 lbs Basic slag ..	1,100	200	8/-	7/-	0 1 0
4	40 lbs. Sulphate of Potash	1,050	150	6/-	5/-	0 1 0
5	100 lbs. Nitrate 248 lbs Super. .. .. 40 lbs. Sulp. of Potash ..	2,300	1,400	56/-	21/3	1 14 9
6	248 lbs. Super .. 40 lbs. Sulp of Potash	900	..	..	13/9	.. *
7	100 lbs. Nitrate .. 40 lbs. Sulp of Potash ..	1,850	950	38/-	12/6	1 5 6
8	100 lbs. Nitrate .. 248 lbs. Super.	1,400	500	20/-	16/3	0 3 9
9	100 lbs Nitrate .. 200 lbs. Basic slag ..	1,700	800	32/-	14/6	0 17 6
10	1,000 lbs Lime ..	1,200	300	12/-	30/-	.. *
11	1,000 lbs. Lime .. .. 100 lbs. Nitrate .. 248 lbs. Super. .. .. 40 lbs. Sulp. of Potash ..	2,400	1,500	60/-	51/3	0 8 9

* Losses in each case.

TABLE II.—Shewing Results from new Plots added in 1906 :—

Plot	Treatment.	Produce	Increase.	Value of Increase.	Cost of Increase.	Profit.
		lbs.	lbs.			£ s. d.
	No Manure.. ..	900	..	..	..	..
1	200 lbs. Govt. Guano ..	2,100	1,200	48/-	12/6	1 15 6
2	16 tons Home-made Farm-yard Manure ..	2,900	2,000	80/-	..	..

This table shews that 200 lbs. Government Guano was the most profitable manure used, both in respect of total clear profit and expenditure per acre on manures; in fact the latter accounts for the former, for the plot receiving this treatment stood only fourth in respect of largest yield. This is only one of many proofs that the heaviest crop is not necessarily the most profitable, and while most people would prefer a profit of 34/9d. on a 2,300 lb. crop to 35/6d on a 2,100 lb. one, we must not overlook the difference in cost of production between 12/6d. and 21/3d.

The Government Guano used supplied 26 lbs. Nitrogen, 16 lbs. Phosphoric acid, and 5½ lbs. Potash per acre. In view of the results obtained by my predecessor Mr. Mason, and Dr. Nobbs both at Elsenberg, and elsewhere in the Western Province, I am still at a loss to know who is responsible for the origin of the myth of deficient phosphoric acid. Judging by a brief experience of two seasons in this Colony, and by all the findings of science and practice on poor soils such as we have, I should say it is high time we abandoned endeavouring to grow profitable cereal crops by the use of phosphatic manures alone. Nevertheless it is highly desirable to use some phosphate to supplement so rich a nitrogenous manure as Government Guano. On certain soils too, potash should be used along with it or in the course of a few years bad effects would be certain to ensue.

In the Marton camp the heaviest crop was that resulting from the use of 16 tons of home made farmyard manure, whose value per ton on one year's crop works out at 5s. It was manifest throughout the growing season that this plot was to lead and undoubtedly much of its value was in the dry year due to the moisture holding capacity of the organic matter in the manure. During the present season this plot will get no dressing, so that the residual value of last year's application may be estimated.

On account of the unsatisfactory results obtained from the application of half a ton of lime in 1905, only two plots were dressed therewith in 1906, they form 10 and 11 in Table I. It will be observed that to last year's loss of 27s. 4d. on the lime alone falls to be added a further 18s. this year which brings the debit balance as compared with no manure to £2 5s. 4d. per acre for two years, but as was formerly pointed out, lime at £3 per ton is at from two or three times the price we can afford to pay for it for agricultural purposes. On plot 11 along with a complete dressing of artificials, an expenditure of £5 7s. 7d. increased the value of the two crops by £5 13s. 2d. or a clear profit of 2s. 9½d. per acre per annum, or a negligible quantity to the practical man. From the scientist's point of view a point demanding explanation by further experiment is:—Why should the lime alone give a somewhat better return than when used in conjunction with Nitrogen, Phosphoric acid, and Potash?

TABLE III.—Shewing effects of Lime applied in 1905 on 1906 crop.

Plot.			Increase.
		lbs.	lbs.
1	No Manure	900	..
2	1,000 lbs. Lime in 1905	1,000	100
3	1,000 lbs. Lime in 1905 .. .. 100 lbs. Nitrate in 1905 and 1906 .. 248 lbs. Super. in 1905 and 1906 . 40 lbs. Sulph. of Potash in 1905 and 1906	2,200	1,300

Here again it will be seen that Lime of 1905 along with complete dressing has done 100 lbs. per acre worse than the complete manure itself this season see plot 5, Table I.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible.

All letters or contributions should be plainly addressed: "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication.

The Divining Rod—Is it a Fraud?

To the Editor, AGRICULTURAL JOURNAL.

SIR,—So much has been heard lately about the "divining rod" and water finding, that an article on the subject in *Knowledge and Scientific News*, putting all sides of the question fairly, is exceedingly appropriate.

The case for the unbelievers is soon summarised: There is almost as much evidence, as far as can be ascertained, of failures to find the predicted spring as of successes. If one points haphazard to any spot on the ground, and a well be sunk at that place, there is a very good chance of water being met with. This probability, combined with a due consideration of the geological and topographical features, will be sufficient to enable a professional water-finder to make a good reputation. If he has the luck to hit off the right spot, his fame will soon be spread. If he fails, the affair is soon forgotten. (Now, Mr. Siebert, will you dare to deny the truth of the above statement? Let me here mention that this man, Siebert was touring our districts a few years ago as a professional water-finder, pretending to have made the astounding discovery, while a prisoner-of-war in Ceylon, that South Africa gets its water-supply from the Himalayas!—A. G. Erlank).

But let us assume that the marvellous manifestations of the "divining rod" in the hands of certain people have been fully and truthfully recorded. If such are true, then we are face to face with an extraordinary force, the nature of which is entirely unknown to us.

In searching for a solution of the mystery, there are two distinct propositions to be considered, since typical "divining" is only supposed to be possible when two factors are suitably combined. These are, a person endowed with a mysterious power, and a forked stick of certain dimensions, and even a particular kind of wood. Sometimes, however, it is said that a wire or steel spring will do as well, while occasionally a "dowser" will declare that he can even tell of the presence of water without anything more than his open hand.

The way in which the rod is held in the hands must not be forgotten.

It is usual to hold it in one particular way, and herein it seems to us is some slight clue. It will be found that if a forked stick of the usual dimensions be held in the orthodox manner, that is, with the tips of the forks enclosed in the palms of the upturned hands, a very slight movement of the hands in a particular way causes the base of the fork to revolve right round, and thus an almost unconscious pressure of the hand will often have an extraordinary effect.

This can easily be appreciated by anyone, even while sitting in one place, and nowhere near any water, holding such a stick and trying to keep it pointing downwards, say, for ten minutes on end. It may be then that a very slight convulsion of the nerves causes the stick to move. In other words, it seems probable that the divining rod is but an index of slight nervous sensations.

Then another important fact is that the power to find water by the help of the rod is said to be confined to a comparatively few people. But this fact seems quite contrary to all we know of the human frame.

It is much more likely that only a few persons happen to have been successful, and are thenceforward supposed to possess the extraordinary faculties. Undoubtedly many people are exceptionally sensitive, for instance, to atmospheric variations. Old wounds and corns frequently indicate some change in the conditions quite beyond recognition by our other senses, and this is a subject that does not appear to have been at all thoroughly investigated.

How, then, can the presence of subterranean water be detected by the nerves?

It is a matter of every-day occurrence to see, on still evenings, light mists hovering over the grass in particular places, and it seems not at all unlikely that such mists will usually be found suspended above the position of some underground spring. Is it, then, not probable that this patch of humidity can be ascertained by instruments, even when the state of the atmosphere is not favourable to the formation of a visible mist? And if the air in this spot is different as regards humidity, temperature, or other property to that surrounding it, is it not possible that human nerves may be so affected that some very slight difference is felt?

And if this is the case, it is not difficult to suppose that someone holding a twig in a constrained position might find in passing into such an atmosphere there was some slight relaxation or contraction of the muscles, and this would undoubtedly cause the twig to revolve. One of the correspondents also mentions how gnats are seen to congregate over particular spots. Whether this is due to dampness of air or other cause has, we believe, not been well ascertained.

The suggestion made by Sir William Preece in a letter to the *Times* is that the running water underground may set up slight vibrations of the ground, which may act upon "the sensitive neutral diaphragm of certain exceptionally delicately-framed persons."

In answer to this, it is pointed out that similar manifestations are visible when gold or some other precious metal is present.

In this case we either feel that a very strong addition is made to the case in favour of the whole matter being a fraud or a delusion, or else that the mystery is one altogether too profound for us to attempt to apply the known laws of nature. One correspondent, indeed, tells of "a respectable farmer in this neighbourhood who could tell under which of several hats a sovereign had been placed." We know of many people who can do this, but without the aid of the divining rod.

There is, however, much evidence as to the finding of lodes of metal ore. Another correspondent declares that he himself can locate lodes of copper or tin ore, and has done so with great success. If metalliferous ores can affect the hazel twig, the suggested theories of humidity and vibration are quite inapplicable, and we must search for some further cause. Some people have vaguely ascribed the results to electrical manifestations, but ignorant people have a way of imputing (often, perhaps, with some truth) all unaccountable phenomena to electricity.

We would suggest that a beginning might be made, as it were, at the other end; that is to say, to conduct some careful scientific observations as regards the hygrometric, thermometric, electrical, and vibratory conditions of the earth and air at a spot beneath which a spring of water was known to exist.

If peculiar conditions were found to exist, then we would know that there might, after all, be something in human "water-divining."

The above is copied from the *Rapid Review* for the benefit of your correspondents on the "Divining Rod."—Yours, etc.,

A. G. Erlank.

New Bethesda, 27th March, 1907.

The Methods of Milking.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the March number of the *Agricultural Journal* I notice an article by Mr. R. Silva-Jones, Government Dairy Expert, on the care of milk on farms. I should like to add to this a few points which certainly are of no less importance, and, therefore, ask you to be good enough to grant me a small space in the *Journal*.

Mr. Jones says milking should be done with the most scrupulous cleanliness and efficiency. This is perfectly true. But if you see a disease, give us also the remedy in the clearest possible manner.

To begin with cleanliness in milking. I wish to point out to the reader that what I am now going to say is not done by rich stock owners, but by those who have to make their living by the milk production of their cows. Before milking is commenced care should be taken to thoroughly wash one's hands in tepid water, and in the same way cleaning the udder and teats of the cow. This can be no obstacle *here*, as milking generally takes place in the kraal, therefore close to the homestead. Then udder and teats should be carefully wiped dry. If this is neglected they are very liable to develop cracks and bursts, which might contaminate the milk. It would be well to remove the milk obtained after the first few pulls, foreign matter being often present in the extremity of the teats. The loss thus caused would be insignificant, the first flow of milk containing very little butter-fat. If desired, it might be mixed with the pigs' food.

Milking being completed, the milk is strained, usually through a thin muslin or other cloth. If this cloth were thoroughly cleansed with soap and soda, it would be admitted that this would be sufficient; but is it always done?

In Europe a certain kind of sieve is used for this purpose, which, if necessary, can be home-made. Construct a square vessel with a solid bottom. The sides of this vessel should be open, and from about a quarter of an inch above the bottom be lined with fine copper gauze. The milk now being *slowly* poured into this vessel, is strained through the sides, and the bottom being a little deeper than the sides, a small quantity of milk will be left at the bottom together with most of the impurities contained in it, these being mostly of greater specific weight than the milk itself.

And now another word about milking. Mr. Jones will excuse me that I never could recommend that method of milking. It is, indeed, not *the* method which imitates the sucking of a calf, and has always an injurious effect on the teats. In other countries—for instance, in Holland, Germany or France—no farmer with a knowledge of milking will keep a servant who milks in this manner. It is *no* method. The operation of milking should be done by the whole hand wherever the teats are fully developed. And where the teats are too small, use the fore and middle fingers, assisted by the bent thumb.

But milking is not to be learnt from books. Practice makes perfect.

Thanking you for insertion of the above.—Yours, etc.,

W. C. VALTER.

Simondium, *via* Paarl, 30th March, 1907.

Preparing Skins for Market.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I notice in the issue of the *Victoria West Messenger*, of the 11th inst., that the subject of the proper curing and the rational subsequent treatment of skins as an article of commerce, and for export, has engaged the attention of the Victoria West Chamber of Commerce at their last meeting, and that it was resolved to approach the different branches of the A. B. en Boeren Vereeniging in the district in the matter, with the object of inducing them to take same up and getting farmers and others to co-operate in bringing about an improvement in the preparing and handling of skins for export.

This, sir, is, I think, a step in the right direction, and one that should and ought to have engaged the attention of those concerned long before now.

However, it is better late than never, and if the endeavours that are now being initiated result in directing the attention of farmers and others to the subject under discussion, and in a consequent improvement in the direction indicated, much will have been gained.

Hitherto, unfortunately, not much care appears to have been bestowed in the treatment of the raw product, and skins unsalted or badly cured, cut, torn, or otherwise damaged, have been only too frequently sent into town for disposal to produce dealers or for direct shipment to the ports.

This has been, and is, a serious error, as will be readily apparent when the price realised for a well treated skin is compared with the amount obtained for a damaged one; and when it is considered that the attention and the labour necessary for properly treating the article in question is but very little more than is bestowed in the case of inferior treatment, one cannot but feel that it is a matter for surprise and regret that the subject has not been, in the past, accorded that consideration which it undoubtedly deserves.

Not only will the producer benefit by realizing better prices for his product, and always find a ready market for same, if he takes some trouble in properly preparing it for export; but the credit and good name of his district —and in a remoter degree those of the Colony—will be considerably enhanced, which will, in its turn, redound again to the producer's advantage.

It is deservedly a matter for congratulation that an increasing number of our farmers have seen and experienced the necessity for the systematic and scientific growing, sorting and packing of wool and mohair—a treatment long ago realized as absolutely necessary in the case of ostrich feathers—and that these same progressive farmers have fallen into line and are reaping the benefit of their energy and foresight in this respect.

May it, then, not reasonably be expected that in their own interests farmers should devote the same care and attention to the treatment of skins?

The matter may to some appear to be but a trivial one; and it is true enough that skins cannot compare in importance with either wool or mohair as an article of export. But when it is considered that the production of sheep and goat skins of the Colony proper for the year ending the 31st March, 1904 —*vide* Census Report—was close upon two and a quarter millions in number, one cannot but come to the conclusion, and admit, that the proper treatment of the product in question is a subject well deserving the most attentive consideration of those directly concerned.

The following hints as to the treatment of skins may, perhaps, be of some use to those who have the handling of same:—

Every care should be taken that skins are not cut or torn when being removed from the carcases of animals; after removal they should be well salted, folded, and rolled up in the usual way; and allowed to remain rolled up until the salt used on them has been dissolved, which will result in a uniform layer of same being deposited on the skin. Undissolved crystals of salt should not be allowed to remain thereon. Skins should then be opened out to dry, and when nearly quite dry, should be folded once lengthways and stored until wanted for being bundled or disposed of.

It is inadvisable to store skins for too long a time, as certain insects— moths—will readily attack and damage them when stored.

During storage they should, more or less frequently, as necessity requires, be taken out and exposed to air and sun, especially in summer; this will, to some extent, clear them of the insects.

A procedure adopted by the writer formerly as a preventative against the attacks of the latter, was to paint the flesh side of the skin with a solution of arsenious acid—white arsenic—put on with a whitewash brush. As arsenic, however, is a virulent poison, it may, perhaps, not be advisable to recommend its universal use, unless the user exercises every care and sees to it that the chemical and the treated skins cannot be got at by those unauthorized, or by domestic animals.

When bundling them for export, skins should be folded, as stated above, and placed in such manner that the leg and belly part of one skin is covered by the back part of another—*i.e.*, one skin with its folded back part to one side, and the skin next above with its back part to the other side.

The width of a bundle should be only the width of a skin, or rather a little more, so as to make allowance for the overlapping of the back part of the skin over the belly part of another.

This mode of bundling skins will in a great measure prevent their being torn when the bundles are being handled, as there will be no loosely projecting parts—parts of the legs—to be caught hold of, a way of handling which coloured labourers and others are very prone to adopt.

The number of skins to be put into a bundle must depend more or less upon the size and weight of same; but bundles should not be made too heavy, for the easier they can be handled the less risk there will be of skins being damaged. From sixteen to twenty long-woolled, full grown merino skins will be quite sufficient for making one bundle, and a number, corresponding in weight, of other skins.

The above treatment of skins has been employed by the writer, who has had some years of practical experience in the curing and handling of different kinds, and can be confidently recommended for adoption by those concerned, as the resultant benefit will more than compensate the producer or the buyer for any extra trouble and labour that he may be put to.—Yours, etc.,

PASTORAL PRODUCE.

Victoria West, 22nd April, 1907.

Scab its Cause, Nature and Treatment.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Seeing that the majority of stock owners hold so many erroneous opinions of Scab, I take the liberty to convey, through the medium of your *Journal*, my experience and treatment of the disease to my fellow farmers.

A great many farmers attribute the cause and outbreak of Scab to bad herdsmen and severe droughts. Well, I will be the last person to run down people for holding such opinions, for if a man has not studied the theoretical part of the disease he can be inclined to form such opinions, because sometimes a farmer finds Scab amongst his flock, he dips the flock a couple of times, gets hold of a good herdsman, the veld improves, and the Scab dwindles away. His flock remains clean sometimes for a year, but as soon as he gets hold of a bad herdsman and the veld gets bad, he finds this same flock infected with Scab again.

The explanation I give to this theory is this: The sole and originating cause of Scab is nothing else but parasites, *i.e.*, small lice, which are so small that ten being put together will be about the size of a pin's head. These parasites only attain the age of twenty-two days. When a female parasite is seven days old she starts laying eggs, and when she has laid fifteen eggs she dies a natural death. These eggs can't very well hatch on a fat animal, because the greasy matter which is then in the animal's skin prevents them from hatching. But these eggs can survive for a considerable time on your fat animals, and still longer in your old infected "kraals." Some eggs, for the purpose of being tested, were placed in a bottle for twelve months, and then placed on a clean sheep, which had never been in contact with scabby sheep before, and within fourteen days living parasites or lice were found on that sheep. This shews that a Scab parasite's egg can still hatch after it is a year old, and this is why a farmer who has not studied the theoretical part of the disease attributes the cause of Scab to bad herdsmen and drought, for if he is in possession of a good herdsman and his veld improves, his stock naturally improves in condition too, and the living parasites, which are then on his sheep or goats, die a natural death after they are twenty-two days' old. And the eggs which they have laid can't hatch on the fat animals because the greasy matter which is then in the animal's skin prevents them from hatching, and the result is he gets his flock free from Scab. But these eggs remain in his old infected "kraals," and as soon as he gets a bad herdsman and drought sets in, the condition of his stock consequently gets worse, and the eggs, which have survived in the old infected "kraals," get a chance of hatching on the lean animals, and the result is he finds his flock infected again.

But if we were to exterminate all these eggs and parasites by dipping our stock effectively, and by burning all the infected kraals, I feel confident that our flocks could not contract the disease again, however poor their condition may become. I maintain that we never will, and we never shall, and we never can get rid of the disease as long as we allow our stock to sleep in the old infected "kraals or legplekke." During last year I supervised upwards of fifty different flocks of sheep and goats, and never have I dipped a flock more than twice to free it from Scab, notwithstanding that their condition was very poor and the veld equally bad.

I have cleaned with only two dippings a flock of 326 goats, and 85 of that number were miserably infected with scab. When I placed this particular flock under order to cleanse they were 500 strong, and only 15 were visibly infected, and when I went to dip them the owner told me that he had dipped the flock six times, and that they were reduced to 326 through Scab and poverty.

I have cleaned with two dippings, too, another flock of goats 412 strong, of which number 51 were visibly infected. When I placed this flock under order, they were 550 strong and only 10 were visibly infected, and when I went to dip them I was told by the owner that he had dipped the flock seven times and that the Scab had increased. I can quote many more similar cases, but I have only mentioned these two as instances.

A great mistake which I find farmers do is by dipping their stock at too rapid a rate. They plunge the animal in at the one end of the dipping tank and out it goes at the other end, and the animal does not remain in the dip for ten seconds. With such fast dipping you only encourage Scab instead of checking it, because the dip never reaches the parasites, and the greasy substance which is still in the skin is washed out by the dip, and the result is the eggs can hatch better, and the Scab gets worse.

I have taken living parasites from sheep with long wool two days after they were dipped, which shews that the animals were not kept in the dip long enough in order to allow the dip to reach the parasites. The parasites which cause the Scab in sheep live on the surface of the skin, and I have scraped off with my knife as many as twenty-six living parasites from an area of about an inch square. The parasites which cause the Scab in goats are of quite a different nature, and much smaller than those of the sheep. They burrow into the skin of the animal. I have found some of these parasites half an inch deep into the skin below the hard crusts. That is why goats must be kept in the dip for a long time, in order that they may soak well, so as to allow the dip to reach the parasites which lie buried underneath these hard scales.

How to dip effectively.—Take 25 lbs. of sulphur, 20 lbs. of fresh lime, mix the same well into a thin paste, boil this mixture for forty minutes, and add 100 gallons of water (counting the water which you have used for mixing, too). Pour the mixture into your dipping tank, close the outlet of your tank with a sheet of corrugated iron or a plank, in order that the animals can't get out too soon. Keep the visibly infected sheep in the dip for fully two minutes, and the visibly infected goats for fully three minutes, and the non-visibly infected stock for fully a minute and a half. No animal must be kept in the dip for less than a minute and a half. After this dipping, give the flock a new "kraal or legplek," and dip the flock in the same manner within fourteen days, again giving them a new "kraal or legplek." Farmers need not be afraid that their stock will die by keeping them in the dip too long, if they dip with sulphur and lime, because out of the fifty flocks which I have dipped last year, I have only killed four sheep and two goats actually through dipping.

I will challenge any farmer that I will clean with only two dippings any flock of sheep or goats, however poor their condition may be, and however poor the veld may be, by keeping the animals in the dip long enough and by giving them a new "kraal or legplek" after each dipping.

I do not expect that all farmers will swallow for gospel everything which I have written about the disease and its treatment, as I know a farmer does not like the idea of being preached at, being a farmer myself; but I simply beg of you to carry out my instructions, as I feel confident that you will obtain satisfactory and permanent results.—Yours, etc.,

R. E. CELLIERS,
Inspector of Sheep, Robertson and Montagu.

The Glen, Klaas Voogds River, April 22nd, 1907.

Inefficacy of Dr. Behring's Serum on Bovine Tuberculosis.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—It might, perhaps, interest the readers of the *Agricultural Journal* to know the conclusions of the Melun experiments of 1904 on Bovine Tuberculosis.

Dr. Moussu, a very prominent veterinarian and a professor of the Veterinary College of Maisons Alfort (near Paris), in a communication to the Society of Agriculturists of France, stated that the experiments which were undertaken in Melun in 1904 under his personal supervision, with the object of demonstrating the efficacy of Dr. Van Behring's Serum, had at first given some very promising results. Unfortunately, afterwards it was found that the expectations were not realised, and to-day we have the undeniable proof that the healthy animals who had been vaccinated with the German Doctor's Serum became tuberculous after having cohabited during the space of one year with animals who had contracted the disease.

This fact does not prove the absolute powerlessness, but the relative inefficacy of the learned gentleman's method.

Notwithstanding that, Dr. Behring hopes to improve his process. It will soon be tried again in several countries, more particularly in the Argentine Republic, where experiments will be undertaken in such conditions that it will establish in a genuine manner the value of that process. But those experiments will only be concluded in a few years to come, and one must wait until then, in order to pronounce oneself with full knowledge upon Dr. Von Behring's method.—Yours, etc.,

S. M. LEWIN, M.S.A.F.

Paris, April 5th, 1907.

Agricultural Shows and Judges.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Writing in conjunction with "Colonist's" letter, of Kimberley, which appears in the last issue of the *Agricultural Journal* in connection with the value of Shows and the Judging thereof, I must say I am pleased that such a valuable point has been brought forward. And I only hope that more of the older and more experienced farmers will come forward to give their advice and help, for it will only be by their help that we can come to satisfactory conclusions.

The Government, on the one hand have shewn their willingness to assist the different Societies to the best of their powers. Now the Societies must appeal to the farmers for their co-operation and experience.

Every Society is doing its utmost to bring its Shows to the highest standard of perfection, which most of them have, more or less, attained. But now comes the question which gives the most trouble—Judges!

No Society can flourish, however hard it may work, or however well off it may be financially, unless it can produce experienced and competent Judges. These are hard to obtain, as judging entails a good deal of hard work and the best of knowledge. Hence, I am quite in accordance with the suggestion made by “Colonist’ ’that a Conference should be held every year (I would add Inter-Colonial Conference), represented by delegates from Government and the various Societies, such delegates to be more or less recommended as Judges in themselves by the Society they represent.

This, so far as I can see, will be the only way to bring about the uniform judging desired by the various Societies, and more especially to bring to the fore the breeds recommended by the Judges as most suitable to the climatic conditions of the country, and most profitable to the farmers.

I will go still further, and suggest that the different Societies be approached with the view to having the prize money increased for such breeds as they find mostly recommended by the Judges at the sitting of the Annual Judges' Congress, and the other prize moneys reduced.

For, as it is at present, you find a farmer possessing a breed which to a certain degree is unsuitable to the country, and for which there is hardly, if any, competition, receiving the same amount of prize money as another breed which is more suitable, and for which there is naturally a keener competition.

As for lectures recommended by “Colonist,” I am rather doubtful of their success. It is very seldom that you find a lecture well represented by the actual farmer. He never has the time to spare, or one or another excuse.

I would suggest the compiling of a printed Judges' Handbook, wherein the points can be registered of every animal judged, which will then enable every breeder to see at once on which points his animal is defective.—Yours, etc.,

A YOUNG FREE STATER.

Zonderzorg, Bloemfontein, O.R.C., March 30, 1907.

The Poultry Sections of Agricultural Shows.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—It may be interesting, and probably produce some good result, if we consider as to what use the Poultry Sections at Agricultural Shows, as at present conducted, do towards advancing the good of our Colonies in the way of increasing our own food supplies.

In going through other sections, we note points somewhat as follows:—

Cattle shew their utility qualities in size, which means an increase in price, as they are sold at so much per lb. when slaughtered; they also shew their value as milk producers, and competitions to prove this are generally held.

Sheep also shew utility qualities in size, and quantity and quality of fleece.

Pigs likewise by size and shape.

And most other sections are represented by exhibits that will be judged for their utility or useful qualities.

But what do we find in connection with the Poultry Section?

There are birds of many breeds and varieties; they are in most instances beautiful to look at, and they are judged principally for their beauty and evenness and colour of their plumage. In a few breeds size counts a fair number of points, but the greatest value is for the plumage.

Do these birds shew their utility qualities, and thus commend themselves to the farming community, as they are at present placed before the public? I think the majority of farmers will say “No.”

The farmer says: “We get almost the same price for one size fowl as another, and the colour of plumage does not affect the price we get, and I can't see what advantage there is in buying these different ornamental birds, as how can I tell that this or that is a good layer and better than I have got at present. There is nothing to shew it, as I look at a bird on the show bench, and it is eggs that pay best, and it is eggs I want, and when I see a bird that lays 150 eggs on the same treatment as another that only lays 100, then I shall be willing to go in for it, and pay a fair price too, for that's business, and means profit."

The above is just a rough outline of what I want to draw attention to, as it is actual fact, and worth consideration.

The Western Province Agricultural Society has, indeed, started a good movement by commencing laying competitions, and it would be of great value to the country if other Societies followed suit, as it would encourage the study of increasing the egg-producing qualities of poultry. This would mean a large asset to the Colonies in the long run, and be of far greater value than the method at present of only encouraging size and plumage, and, in fact, principally the latter.—Yours, etc.,

COLONIST.

Kimberley, April 23rd, 1907.

Bare Fallows.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—If I may trespass on your space I should like to call your readers' attention to the making of "Bare Fallows," as I find such good results here as well as in England.

I notice my neighbours are satisfied with one crop a year which is grown during the wet months (winter), and leaving the land lying hide-bound all the summer, instead of ploughing it as often as possible to give it sun and air, which is so needful to the soil, besides destroying all weeds which are drawing the strength of the land.

We grew our best wheats in Sussex after a fallow, which was ground broken up during the winter, and ploughed four or five times during the following summer. I myself have grown 8 qrs. (64 bushels) per acre after that treatment.

I find the more this sand is ploughed the better results are attained; in fact, a plough is about the only implement we have here (and in my opinion the plough is the tool of tools on any farm).

These sands can be ploughed with a pair of little mules (12 or 13 hands), with one boy with reins easier than the stiff loams at Home with a four-horse team of big horses.

I maintain dairymen in this lovely climate could grow two or three crops of green forage per annum if they will only dung and *plough* the land thoroughly.

A month's fallow here is equal to a year's fallow in England, owing to climatic conditions.—Yours, etc.,

E. GOLDSMITH.

Newlands, April 16th, 1907.

Poultry Farming and Fowl Sickness.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Kindly insert the following in your *Journal* if it meets with your approval.

My experience in the above may possibly prove of some benefit to others. Many trials are being conducted to secure the best type of egg-laying fowls, but these experiments are all made from September to December, instead of covering the whole year. In that case the best layers are those which continue laying during February and March. These, having hatched in May and June, commence laying in November or December, and while the other fowls, hatched during the summer months are all moulting in February, whether young or old, those hatched during May and June will not moult, but continue laying, and a twelve months' trial will prove them far superior to the best laying hen. Hatching during May is generally impossible for want of an egg-laying hen, and consequently for want of a sitter. With an incubator, the first thing is to get the type of hen which lays her eggs in May, and I have no difficulty at all to get brood hens at that time. Neither am I troubled with the minute insects on the chickens as is the case during summer, nor with kites (?) (kuikendief). For fowl-sickness I administer a dessert spoonful of castor-oil or Epsom Salts, no matter what the complaint may be, the cause being always constipation, producing enlargement of the liver or blue comb. When a fowl won't feed in the morning, give a dose of oil immediately, and if it still refuses to eat the next day repeat the dose. Sometimes they are feverish, and drink a lot of water—all the result of constipation. Two of my hens are now sitting—eight days already. I have done all I could to secure eggs from a good type of layers, but in vain, and so I had to take eggs from my mongrel Leghorns for brooding purposes.—Yours, etc.,

T. P. RETIEF.

Paarl, April 20th, 1907.

Pampas Grass to Prevent Sluits.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Some eight or ten months ago, or before and immediately after the session of Parliament, a good deal of attention was called to the terrible wastage of the soil that was going on throughout the length and breadth of the country.

Some very able letters and papers appeared, including one from our late highly respected irrigation expert, from Mr. Sim, Conservator of Forests, and from some of our leading agriculturists.

The matter also received the earnest attention of some of our Farmers' Associations, when some very valuable discussions took place. It was invariably pointed out by all these writers and speakers what a great and growing evil the sluit question was becoming.

At these meetings it was unanimously agreed that unless very drastic measures were taken to preserve this, our most precious asset, the agricultural and pastorial industry would be very much endangered by these constantly increasing inroads. One of the speakers described the work of destruction that was going on as appalling. In this I thoroughly agree with him, for it is truly alarming to see how in some parts the country is being cut up, carrying with every flood the rich deposit of ages, which is lost to us for ever. Mr. Van Rooy, in his place in Parliament, when discussing the Irrigation Bill, endorsed these statements, and in a very able and practical speach shewed, not only how the face of nature was being defaced, but through our criminal neglect the country was deteriorating.

Since then the monsoons have brought copious and abundant rains to our famished and stricken country.

This has removed the gloom and feeling of despair from the farmers' minds for the time being. With brightened prospects and a season of plenty they have for the moment forgotten this hideous defacement, which, hide it as they like, in the near future points to ruin. Any way, the agitation seems to have ceased, but I should like to know how many millions, nay, I may say billions of tons of what constitutes the inherent wealth of the country, has been swept away by the blessed rains, which have brought back the smile of content to the farmer. Now is the time to gauge the extent of the mischief wrought by watching the huge slices of earth, and the great gaping cracks loosened by the prolonged droughts, and now is the time to arrest the precious silt by planting suitable trees, shrubs or grasses. The banks and surroundings of the sluits being moist. they would be able to strike deep root, and by layering, resist the floods. I tried this plan with ordinary as well as with basket willows.

It answered admirably by catching up the debris. It offered a certain amount of obstruction, and helped to retain the silt. In a subsequent drought, after they had attained considerable dimensions, I found the willow to be an excellent fodder. With the moisture retained in the bed of the sluit, they were enabled to put forth leaves and twigs, and were in reality the only green thing in the neighbourhood, the famished stock eating it with avidity.

The plan I adopted was, when the shoots were well grown, I dug a fairly deep trench, in which I placed the layer with the end striking out. To make it secure, particularly if the branch was a strong one, I placed a roundish stone on it, on a level with the surface of the soil. Thus, being imbedded and presenting a comparatively smooth surface, the water passed over it without displacing it. The next season I placed an inset layer, not quite so deep, or if two trees were placed on opposite banks, I twisted the two branches together before putting them in the ground. This, I think, could not be improved upon for simplicity.

If time admits, and stone is handy. it is an advantage to build a series of low walls at the falls. This retains the silt and also a great amount of moisture. At the outflow. or terminus of the sluit, the ground is generally pretty level, and naturally leaves a deposit of silt. Here I would plant several rows of Pampas grass alternatively in a crescent shape, with the points towards the stream.

It is a hardy, prolific, drought-resisting plant, and when once thoroughly established will grow into a dense mass presenting an impenetrable barrier to the silt, while permitting the water to filter through. It is very tenacious of life, and when once well rooted, is practically indestructible, even by fire, and from its great wealth of foliage, would be a splendid stand-by in times of dearth, It would have to be protected by a fence, while young, but you would gain in fodder much more than would repay the outlay. I saw wonderful results from a patch of this grass originally planted for ornamental purposes. This had spread, and headed a sluit that was eating its way into a garden, effectually preventing further erosion. The sides of the sluit had been kept moist by irrigation or the overflow. This afforded a foothold for the grass, which speedily sent its roots into the soft earth, giving it a most luxuriant appearance.

The farmer said that it was invaluable to him, that during the previous drought when the earth was completely denuded of grass by keeping it wet he was enabled to save quite a number of his starving cattle as well as keeping himself in butter and milk. He further said that he intended to propagate more of it to protect the walls of the sluit from falling in and to give him a greater supply.

This is easily done from suckers. These require a little nursing at the beginning, after which they are able to fight for themselves. Then they would always be kept in heart by every little rain, and fed by the cream of the soil. The vigorous growth and great density of the Pampas grass in the Botanic Gardens affords a splendid object lesson of what I wish to convey, and is a speaking evidence, which ought to appeal to every farmer of its great utility for this purpose. Paspalum may to some extent serve the same purpose, where the rush of water was not so great, but it is not so drought-resistant, so firm in the stem, nor so deep rooted, and therefore is more liable to be washed away.—Yours, etc.,

E. R. Bradfield.

Rondebosch, April 6th, 1907.

Horse Sickness.

To the Editor. AGRICULTURAL JOURNAL.

SIR,—Allow me to contradict Mr. T. N. Walker. This gentleman, in your issue for April, says Horse Sickness is caused by the bites of a certain fly. But what, then, is the cause of the discharge of bile (gal) from mouth and nostrils as soon as the animal dies? Our experience in these parts is that arsenic, as well as Cooper's dip, mixed with common salt, is the best preventive, and at the same time an antidote. It also will, according to my humble opinion, assimilate the superfluous bile. By inserting the above hint in your next issue, you will greatly oblige.—Yours, etc.,

J. S. DE VILLIERS, SENR.

Grasvlei, District Beaufort West, April 25th, 1907.
[Translated from the original Dutch.]

Water Drills and Water Boring.

To the Editor. AGRICULTURAL JOURNAL.

SIR,—I read a letter in the *Agricultural Journal* about Water Drills and Water Boring with considerable surprise, and must say that Mr. W. H. Wayland appears to have been very unfortunate. About here a percussion water bore has been at work for a considerable time putting down holes up to, and even over, 300 feet through very hard rock with signal success. Almost in all cases good water was struck, and windmills are the order of the day. There is one *20-foot* Samson drawing a good supply from a hole 300 odd feet deep. The only rock that is not worked in these parts is the "ironstone," not because the stamper cannot penetrate it, but because from experience it has been found—unless of only a few feet thickness—quite barren of water supply. I have no interest in any species of pumping or drilling apparatus, and write only in the interests of agriculture.—Yours, etc.,

A. S. J.

Loxton, April 29th, 1907.

Return of Fruit Shipped from Cape Colony to England during March, 1907.

Port of Shipment.	No. of Packages.	Description of Fruit.	Quantities.	Value.		
				£	s.	d.
Cape Town.	13,048	Grapes	208,210 lbs.	2,533	14	0
,,	4,405	Pears	109,437 (No.)	634	3	0
,,	2,900	Plums	86,026 ,,	304	13	6
,,	96	Apples	2,330 ,,	11	16	0
,,	39	Nectarines ..	1,170 ,,	5	17	0
,,	1	Watermelons ..	10 ,,	0	5	0
,,	3	Mangoes ..	36 ,,	0	9	0
,,	6	Peaches	180 ,,	0	18	0
,,	2	Pineapples.. ..	70 ,,	0	17	6
,,	2	Quinces ..	40 ,,	0	6	0
	20,502			3,492	19	0
Port Elizabeth ..	345	Pines	16,331	60	7	6
,,	57	Assorted Fruits ..	1,521	31	0	0
	402		17,852	91	7	6
Total ..	20,904			£3,584	6	6

RURAL REPORTS.

Burghersdorp, 16th April.—Weather cold and very changeable. The veld was in very good condition but the locusts are clearing it all off and things are beginning to look bad for the winter unless they leave. Heavier rains have fallen than have been experienced for some years past. The vines this year seem to have suffered through receiving too much rain. Cattle and horses doing well.

Bathurst, 15th April. Fair weather with average rainfall and the veld is in fair condition. Vines on Cape Stocks doing well. Citrus fruits shewing well. Scale rather troublesome. Good crops of mealies, and kafir corn is doing fairly well. Stock generally in fair condition.

Clanwilliam, April.- Hot weather in the day time with cold nights. Lighter rainfall than usual and the veld is in fair condition. Apples and pears doing fairly well. The codling moth is in the apple trees. What little lucerne there is is doing very well. Stock generally doing well.

Fort Beaufort, 24th April.—Weather mild with average rainfall and the veld is in very good condition. Cereals doing very well. Lucerne in very good condition. Horses and cattle in good condition but sheep not doing so well.

Hay, 18th April.—Mild warm days have been experienced and the veld is in very good condition. The rainfall has been heavy. The few vines there are are on Cape Stock and are doing well. Fruit crop very satisfactory and there are no insect pests to speak of. Fairly good crops were expected this season but everything has been destroyed by locusts. Stock generally in good condition.

Herschel, 11th April.—Warm weather with frequent thunderstorms. Veld in very good condition Fruit season is over. Late crops of oats fair. Mealies and kafir corn in very good condition. Cattle doing well.

King William's Town, 14th April. Changeable weather with average rainfall. Veld in good condition. Mealies and beans in good condition. Kafir corn troubled with honey dew. Cattle, horses, goats and pigs in good condition, sheep doing fairly well.

Ladismith, 12th April.—Very good weather with good rainfall and the veld is in very good condition. Mealies in fair condition, lucerne doing well. Cattle in bad condition, horses and sheep doing well.

Malmesbury, April 17th.—Good weather with light rains. Veld very dry. Stock generally doing fairly well.

Middelburg, 29th April.—Weather cold and wet with a few fine days between and the veld is in good condition. Fairly good crop of wheat and oats. Extremely good crop of mealies. Lucerne doing very well. Cattle in good condition.

Oudtshoorn.—Very rains have fallen causing damage to lands, etc., but taken all round, the weather has been very satisfactory. Lucerne doing very well. Good crops of mealies. Stock generally doing fairly well.

Peddie, April 5th.—Weather mild and warm with light rainfall. Veld in fairly good condition. Mealies have suffered more or less from blight and drought. Kafir corn in fairly good condition. Stock generally doing fairly good.

Queenstown, 5th April.—Very hot weather for the first three weeks of the month but plenty of rain has fallen during the last week. The veld is in good condition and if the locusts will only keep away, there are prospects of a good winter. Hail destroyed nearly all the grapes. Fruit not very good, damaged by hail and insects. Lucerne doing very well. Mealies promised well but were damaged by locusts. The oat crop did not turn out so well owing to the damage done by rain when reaping was being carried on. Stock generally in very good condition.

Riversdale, 17th April.—Average weather and the veld is in very good condition. The rainfall has been heavy. Fruit crop good. Mealies and lucerne doing well. Stock generally in good condition.

Robertson, 1st May.—Weather getting cooler with average rainfall and the condition of the veld is improving day by day. Vines doing well except those infected with Phylloxera. Fruit very much damaged by the Codling moth. Lucerne splendid.

Somerset East, April.—Weather wet, windy and rather cold. Veld in the best condition. Fruit very bad, full of maggots. The yield of cereals was very much affected by the heavy rains during reaping. Stock generally doing well.

Stutterheim, 7th April.—Weather cold and wintry with good rains and th veld is in good condition. Little wheat has been sown. Oats are being sown now for winter feeding for small stock. Mealies very fair and kafir corn doing well. Stoc generally in fair condition.

THE TRANSKEI.

Cofimvaba, May 1st.—The superabundance of rain during the last month or two has caused considerable damage to mealie crops especially in places where the lands are low lying, but Kafir corn crops do not appear to have suffered much from the excessive moisture, and a good yield is expected. The pasturage is in very good condition and apart from Redwater which continues to be very prevalent, stock may be described as in good condition too.

Flagstaff, 3rd April.—There is little to add to my last report. The weather has been seasonable. About three-and-a-half inches of rain fell during the month. One case of lungsickness and two of Redwater were reported during the month. The usual steps were at once taken to prevent the spread of the disease in each case. The pasturage is good and stock of all kinds is in excellent condition.

NOTES ON THE WEATHER OF MARCH, 1907.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission.

Mean atmospheric pressure about four-tenths higher than usual, temperature slightly lower than usual, with cool days and warm nights, with a practical absence of frosts, a high percentage of cloud, a normal quantity of rainfall, well distributed, a decreasing but still large number of thunderstorms, with light winds and daily local fogs were the principal features of the weather of March.

Precipitation.—The mean rainfall during this month, based on the records of 360 stations, was 2·68 inches falling on eight days, being only 0·01 in. or considerably less than 1 per cent. lower than the normal. Precipitation thus shews an increase of 0·38 ins over the amount for February last, and of 0·44 in. over that for the corresponding month of 1906. Compared with the records of the previous month there was an increase of precipitation in the South, the West and the more central portions of the country, but a decrease in the East, including the East Central Karoo, the South-East, Kaffraria, Orange River Colony, Durban (Natal), Bechuanaland and Rhodesia. The rains were mostly moderate and frequent, falling on a large number of days, the best watered portions being Basutoland, Kaffraria and the North-East, with means of 5·84, 4·46 and 4·20 ins, respectively; precipitation over these areas was in excess of the average by 23, 11 and 5 per cent. respectively. The accompanying tabular statement shews that the mean rainfall was also above the normal in the West and South Central areas and the more northerly and inland portions of the Colony by amounts varying between 75 per cent. over the Southern Karoo and 5 per cent. over the North-East.

Division.	Mean Rainfall (1907).	Mean No. of days.	Average Rainfall (1891-1900)	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ..	2·40	6	1·54	2	+ 0·86	+ 56
South-West ..	1·10	3	0·84	3	,, 0 27	,, 32
West Coast ..	·20	1	0·46	2	— 0·26	,, 57
South Coast ..	3·02	8	2·06	7	+ 0·96	,, 47
Southern Karoo ..	2·28	4	1·30	4	,, 0·98	,, 75
West Centraal Karoo	1·40	6	1·53	4	— 0·13	— 8
East Central Karoo ..	1 26	5	2·42	7	,, 1·16	,, 48
Northern Karoo ..	2 94	8	2·41	6	+ 0·53	+ 22
Northern Border ..	3·27	9	2·85	7	,, 0·42	,, 15
South-East ..	2 34	10	3·61	9	— 1·27	— 35
North-East ..	4·20	11	4·00	10	+ 0·20	+ 5
Kaffraria	4·46	13	4·02	10	,, 0·44	,, 11
Basutoland ..	5·84	12	4·75	12	,, 1·09	,, 23
Orange River Colony ..	2·75	7	3·50	8	— 0·75	— 21
Durban (Natal) ..	1·96	10	4·96	..	,, 3·00	,, 60
Bechuanaland ..	2·19	8	4 78	9	,, 2·59	,, 54
Rhodesia ..	1·91	6	3·68	9	,, 1·77	,, 48
Walfish Bay (S.W. Afri.)	·00	0	0·07	1	,, 0·07	,, 100

There was no rainfall at Walfish Bay and there was a deficiency in the East and contiguous territories, ranging from 60 per cent. at Durban (Natal) to 8 per cent. over the West Central Karoo. Summarising the monthly totals it is found that of the 360 stations only nine, situated in the West and South-West, reported "Nil," whereas 56 had 0·01 to 1 in.; 84 had 1.01 to 2 ins.; 71 had 2·01 to 3 ins.; 64 had 3·01 to 4 ins.; 36 had 4·01 to 5 in.; 19 had 5.01 to 6 in.; 13 had 6·01 to 7 in.: 5 had 7.01 to 8 ins., leaving three with more than eight inches; of these last the maximum of 8·43 ins. was registered at Bellsbank (Northern Border), the second largest amount being 8·19 ins. at Bazeya, and the third 8·15 ins. at Engcobo, both in Kaffraria. On similarly treating the maximum amounts recorded in 24 hours, it is found that of the 343, supplying the necessary details, 211 (exclusive of the nine with "no rainfall") had maxima of 0·01 to 1 in.; 98 had 1·01 to 2 ins; 19 had 2·01 to 3 ins; 5 had 3·01 to 4 ins., whilst 5·00 ins. were recorded at Swellendam on the 31st. The second heaviest fall in 24 hours was 4·00 ins. at Newlands (Montebello) on the 17th. *Thunderstorms* although less numerous than during the previous month were still frequent and widely distributed, 503 instances of this phenomenon being noted on 26 days of the month. They occurred from 1st to 11th, 14th to 17th, and 21st to the end of the month, being most numerous on the 3rd, 4th, 9th, 23rd and 28th to 31st, particularly on the 29th. *Hailstorms* occurred at 22 stations on nine days, most numerously on the 28th and 29th. The most severe instance of this form of precipitation during the month occurred at Aliwal North on the 28th when large hailstones, some being larger than a pigeon's egg, fell from 8.20 to 8.40 p.m. In consequence of the severity of this storm all crops in the town were damaged, window panes and other glass smashed, whilst indirectly considerable damage was caused to stores through leakage from the roofs. The hail was reported as lying on some roofs to a depth of four to six inches. No *Snow* was reported during the month, although *Sleet* was noted at Slaate on the 3rd.

Temperature, Cloud and Wind.—The mean temperature of all stations was 67·3° or 0·3° less cooler than the normal. Compared with the previous month there is a drop in the temperature curve of 2·6°, although reaching the same point as in March 1906. The days were considerably cooler than usual, the mean maximum for the month being 77·3° or 1·7° below the average; on the other hand, the nights were considerably warmer than usual, the mean maximum being 57·3° or 1·1° higher than the normal. Compared with the corresponding values for February, the mean day temperature curve was falling about one-half as rapidly again as the night curve, the mean maximum for this month being 3·1° lower than the similar value for February, as against a decrease of only 2·1° in the night temperatures. The mean daily range (20·0°) for March was 2·8° less than usual. Considered broadly, the mean monthly temperature was about or slightly above the normal in the West and South and higher than usual by 1 to 2 degrees in the South-East, Kaffraria, Basutoland and the interior, although local conditions seem to have had a modifying effect in the opposite direction at certain stations. Over the South-West, the Southern Karoo and at certain places in the South-East, there was a subnormal monthly temperature of 1 to 2 degrees cooler than usual. Thus Disa Head (Table Mountain) was 1·7°, and King William's Town 1·8° below the average, the greatest deficiency being 2·5° at the Devil's Peak Plantation in the Cape Peninsula. The days were generally 1 to 2 degrees cooler than the average at most of the coast stations, the most notable exceptions being Port Nolloth where the mean maximum was three degrees above the average and Cape Agulhas and Cape St. Francis which were 1 to 2 degrees warmer than usual during the day; the largest deficit was 3·4° at King William's Town, subnormal day temperature prevailing also at most of the stations in the South-East, parts of Kaffraria and at Hopefountain (Rhodesia). Over the remaining portions of the country the mean maxima were mostly above the average by 0·5 to 1 degree, the greatest excess of 3° occuring at Aliwal North. The mean minima by were generally above the average at the Coast Stations by 0·5 to 1·5 degrees along the coast and for some distance inland, the excess rising to over two degrees at the more central stations, being greatest, 2·9° at Rietfontein (Aliwal North). These night temperatures were, however, lower than usual at most of the stations in the South-West by about half a degree, the deficit increasing to over 1 degree at Port Nolloth and to more than 2 degrees at Amelianstein and Somerset East, the deficiency at Hopefountain being 0·8°. The mean warmest station was Kimberley with 72·5° and the mean coolest Disa Head, with 58·6° a difference of 13·9°. The highest mean maximum was 86·1° at Kimberley and the lowest mean maximum 45·8° at Bensonvale. The warmest days occurred mostly during the periods from 3rd to 5th, 9th, 10th, 17th to 22nd and most commonly on the 20th, 3rd and 9th, although the highest temperatures for the month were recorded also on the 1st, 26th and 27th. The coldest mornings were mostly those of he 24th to 27th, although absolute minima were also recorded from 1st to 3rd, 5th to 7th, on the 13th, 15th, 17th, 18th, 20th, 29th and 31st. The mean of the highest readings was 90·3° or 2·8° less than in the corresponding month of 1906, but half a degree more than in February last; whereas the mean of the lowest readings was only 49·8°, being 2·7° lower than the previous month, but 3·5° higher than in March, 1906, indicating a much milder state of the weather this year than during the preceding year at the corresponding period. The mean monthly range was therefore 40·5° as against 37·3° in February last and 46·8° in March, 1906. Temperatures of 100 degrees or over were confined to King William's Town, where 103° was registered on the 20th and to Hopefountain where the maximum for the month was 100·3° on the 26th. The shade temperatures practically continued above 40° throughout the month, the absolute minimum being 36·0° at Bensonvale on the 1st. There was therefore an extreme monthly range of only 64° over all the stations. *Frosts* were reported from only two stations being noted as "sharp" at Sutherland on the 5th and "slight" at Fort Fordyee on the 25th.

The mean amount of *Cloud* was fairly uniform over all the stations being mostly about 50 per cent., although ranging from 71 per cent. at Main and Port St. John's, to 24 per cent. at O'okiep. Generally speaking it was usually about 50 per cent. along the West and South Coast, increasing to 64 per cent. at East London, 70 per cent. at Cape Agulhas and 71 per cent. at Port St. John's. Over the South-West Division it was from 25 to 35 per cent. increasing however to over 40 per cent. in the Karoo and the High Veld, and reaching 63 per cent. at Kimberley. Over the South-East it was mostly about 55 per cent. but decreased in the more northerly portions of Kaffraria to slightly under 40 per cent.; at Hopefountain it amounted to 48. The mean proportion of sky obscured at all stations was 48 per cent. being 8 per cent. above the average and 7 per cent. more than in February last. *Fogs* or *Mists* were slightly more numerous than during the previous month, 134 instances being noted as occurring on the 31 days of the month. They were most numerous on the 1st, 6th, 9th, 10th, 14th, 15th, 22nd to 27th and 31st.

The prevailing *Winds* were Southerly to South-Easterly in the West and South-West, Easterly at Cape Agulhas, Westerly along the South and East Coasts, Northerly at Walfish Bay, and mostly calm with a tendency to an excess of South-Easterly winds in the interior and at Hopefountain. At the Royal Observatory (Cape Peninsula) there was a decrease more particularly in Northerly and North Westerly winds, as well as in those from those points of the compass lying between South and W.S.W. as well as of true South-Easterly winds, but a marked increase in those from due West, as also from S.S.E. and N.N.W. The mean *Wind-force* on the Beaufort Scale (0 to 12) was 1·38 corresponding to a mean velocity of 9·9 miles per hour or 1·3 miles per hour less than in February. At the Royal Observatory the morning winds had a mean hourly velocity of 3·5 miles less than usual. One instance of a *Duststorm* was reported from Lady Grey on the 22nd, whilst the wind was reported as attaining the force of a *Gale* at 4 stations on 4 days. No *Hot Winds* were reported.

A loud *Earthquake* shock occurred at Kokstad on the evening of the 16th.

Notwithstanding the steady soaking rains which were fairly general during the last week of the month, saturating the ground at Kokstad, the country is reported as being very hard and dry at Sunnyside, near Grahamstown. *Locusts* continue to shew themselves in enormous swarms in the Central Districts causing serious damage to crops, particularly at Waverley, Carnarvon Farm, Barkly West, Griquatown, Lyndene, Middlecourt and Sterkstroom.

OBSERVERS' NOTES.

Malmesbury.—Very hot most days of the month, changing to strong winds at night.

The Meadows.—This month was very dry up to the 26th when a good old steady rain set in, all of which soaked into the ground.

Waverley.—Locusts came on the 4th and remained all the month, doing irreparable damage to the crops and veld. Very hot weather from the 10th up to the 27th.

Griquatown.—District overrun with locusts both fliers and voetgangers.

Fort Fordyce.—Sheep are still dying in parts of the District, other stock doing well.

Sunnyside (Albany).—Badly in want of rain, ground very dry and hard.

Aliwal North.—On the 28th a severe hailstorm broke over the town at 8.20 p.m. till about 8.40 p.m., some stones being larger than a pigeon's egg. All crops in town damaged and a considerable amount of window glass broken, also considerable damage done in stores through leakage from roofs. Hail about 4 to 6 inches thick on some roofs. All glass globes in cemetery broken.

Carnarvon Farm.—The special features of this month are the small though frequent showers for the earlier part of the month—up to the 24th, we had only 1·15 but the huge balance for the last 6 days has quite upset all calculation. In 1901 we had 4·95 for March; in 1906 we had 3·30; and 1907 we had 3·58. Frosts, nil; windy days three, cloudless nil. In 1901 we had one frost, in 1903 two frosts, in 1906 two frosts, in 1907 no frosts. Bar a strip 20 miles by 8 of which Carnarvon Farm is the centre—the rains from September last till now have been general and continuons. We along here have lost quite a quarter of mealie crops through dry spells in January, February and early part of this month. Locusts have done a fearful lot of damage in this part of Wodehouse; great quantities of land bared bar the mealie stocks. The trouble is that no end of swarms are breeding about here, in fact they are distributed everywhere. This year with the first Spring rains, I must turn "Job's comforter" and prophesy that the locust plague from the Transvaal to the Border Coast will be worse than for very many years past. Locust birds have disappeared for months and the vast swarms are lying intact and undisturbed.

Lyndene.—Enormous swarm of winged locusts in the District.

Middlecourt.—Great swarm of locusts swept veld and damaged crops.

Kokstad.—Country saturated with rain. Rivers running high. Country and stock in grand condition.

Groot Drakenstein.—Mean temperature of month 1·4° below average. The mean minimum being nearly 2·0° lower than usual. Rainfall 3·18 inches above the mean of 14 years (1·12) or nearly four times the usual quantity. Up to the 17th it had been exceedingly dry since the beginning of the year, only 0·38 ins, having fallen, when an exceptionally heavy rain set in, 3·75 inches falling in 13 hours, forming a record for this District.

Kokstad.—We have had a good deal of rain this year and if we get some more during April a plentiful supply of early spring grass should be assured. There was a loud rumble of earthquake on the evening of the 16th.

TEMPERATURE, MARCH, 1907.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory ..	76·5	60·3	68·4	91·0	9	55·0	17
Wynberg	75·7	58·9	67·3	87·5	9	54·0	25
Simon's Town	77·4	63·4	70·4	88·9	9	58·0	24
Table Mountain (Disa Head)	64·9	52·3	58·6	82·0	3	46·0	24 & 25
Devil's Peak	70·1	54·8	62·4	86·0	3	50·0	24
Sea Point	76·5	58·3	67·4	91·2	9	53·0	25
Cape Town (Hospital) ..	76·0	58·1	67·0	91·0	9	55·0	7
S. A. College	78·3	58·7	68·5	94·0	9	53·5	15
Robertson (Plantation) .	83·5	57·5	70·5	99·7	3	47·0	5
Groot Drakenstein ..	81·3	57·5	69·4	96·8	3 & 9	47·9	7
Elsenburg Ag. College ..	75·6	52·4	64·0	92·9	3	45·0	2
Wellington (Hug. Sem.) ..	81·0	59·5	70·2	93·8	3	51·2	24
Port Nolloth	69·6	51·5	60·5	82·0	27	43·5	7
O'okiep	83·2	57·1	70·2	91·6	9	48·1	1
Mossel Bay	74·8	61·9	68·3	83·0	18	55·0	7
Port Elizabeth (Hill Lightho.)	74·7	63·6	69·1	82·0	20	57·0	26
Cape L'Agulhas ..	72·4	62·0	67·2	76·0	3	56·0	7
Heidelberg	77·2	59·9	68·6	93·0	3	52·0	5
George (Plantation) ..	72·8	58·2	65·5	84·8	19	49·0	25
Cape St. Francis ..	73·1	62·3	67·7	76·0	4	56·0	26
Uitenhage	81·6	60·2	70·9	97·0	4	50·2	25
Amalienstein	82·6	57·0	69·8	95.0	3 & 4	47·0	6
Somerset East	79·5	54·9	67·2	95·9	20	45·8	2
Hanover	78·8	51·7	65·2	88·0	17	43·0	2
Murraysburg	80·6	53·9	67·2	91·0	10	46·0	24
Kimberley	86·1	58·9	72·5	97·7	20	48·9	13
East London	74·6	64·0	69·3	81·0	17 & 22	58·0	25
Bedford	78·0	55·3	66·6	97·0	21	46·0	2 & 31
King William's Town ..	80·9	59·4	70·2	103·0	20	51·0	25
Sydney's Hope ..	77·2	59·1	68·1	94·0	20	49·5	25
Aliwal North	82·1	54·1	68·1	95·0	20	44·0	29
Evelyn Valley	72·4	54·6	63·5	90·0	20	46·0	25
Bensonvale Institute ..	77·0	45·2	61·1	88·0	20	39·0	1
Queenstown	81·2	57·2	69·2	99·0	20	44·0	31
Rietfontein (Aliwal North)	76·6	53·9	65·2	86·8	20	47·0	31
Umtata	79·7	59·4	69·5	97·0	20	52·0	26
Mount Ayliff	81·3	58·9	70·1	96·5	20	52·0	24
Main	75·3	57·2	66·2	88·0	5	50·0	2
Kokstad (The Willows) ..	76·3	53·1	64·7	87·8	20	46·1	26
Tabankulu	76·7	57·2	67·0	89·9	20	49·8	3
Port St. John's.. ..	78·7	65·9	72·3	84·0	1 & 18	62·0	25, 26 & 27
Mohalie's Hoek ..	77·3	49·9	63·6	85·0	22	44·0	20
Leribe	76·8	52·2	64·5	83·8	21	43·7	18
Hope Fountain ..	78·7	57·1	67·9	88·9	19	51·8	29
Walfish Bay	74·2	59·5	66·8	100·3	26	54·0	18
Means	77·3	57·3	67·3	90·3	..	49·8	..
Extremes	..	..	..	103·0	20	39·0	1

RAINFALL, MARCH, 1907.

I. CAPE PENINSULA:	INCHES
Royal Observatory (*a*) 12 inch gauge	0·83
Cape Town, Fire Station	1·08
Do. South African College	1·78
Do. Signal Hill	0·72
Do. Hospital	0·72
Sea Point (The Hall)	0·89
Do. (Attridge)	0·99
Camp's Bay	1·07
Table Mountain, Kasteel Poort	3·5
Do. Waai Kopje	5·08
Do. St. Michael's	6 15
Devil's Peak Blockhouse	3·37
Do. Nursery	3·20
Woodstock (The Hall)	1·02
Do. (Municipal Quarry)	2·08
Do. (Do. Nipher's Shield)	2·59
Newlands (Montebello)	6·30
Kenilworth	4·08
Wynberg (St. Mary's)	2·16
Groot Constantia	3·08
Tokai Plantation	1·32
Plumstead (Culmwood)	1·53
Simon's Town (Wood)	1·33
Do. (Gaol)	0·95
Cape Point	0·19
Maitland Cemetery	1·15
Tamboer's Kloof	1·62
Newlands Res. No. 1	6·83
" " " 2	5·89

II. SOUTH WEST:	
Eerste River	0·91
Klapmuts	1·61
Stellenbosch (Gaol)	0·74
Somerset West	1·17
Paarl	3·37
Wellington (Gaol)	1·97
" Huguenot Seminary	1·86
Groot Drakenstein (Weltevreden)	4 30
Porterville Road	0 50
Tulbagh	0·02
Kluitjes Kraal	0·20
Ceres	1·77
Rawsonville	0·44
Caledon	0 00
Worcester (Gaol)	0·00
Hex River	0·09
De Doorns	1·15
Lady Grey (Div Robertson	0·00
Robertson (Gaol)	0·70
Do. (Govt. Plantation)	0·35
Montagu	0·92
Danger Point	0·32
Vygebooms River	0·96
Elgin Plantation	1·72
Elsenberg Agricultural College	1·38
Roskeen	1·16
Vruchtbaar	2·06

III. WEST COAST:	INCHES
Port Nolloth (Lieut. Barber)	0·00
Anenous	0·00
Klipfontein	0·00
Kraaifontein	0·00
O'okiep	0 00
Springbokfontein	0·36
Concordia (Kraphol)	0·25
Van Rhyn's Dorp	0·21
Dassen Island	0·29
Malmesbury	0·68
Piquetberg	0·46
Zoutpan	0·06
Wupperthal	0·31

IV. SOUTH COAST·	
Cape Agulhas	0·42
Bredasdorp	3·75
Swellendam	5·69
Zuurbrak	3·84
Grootvaders Bosch	3·59
Heidelberg	2·76
Riversdale	1·05
Mossel Bay	0·38
Great Brak River	1·35
George	3·46
Do. (Plantation)	3·75
Woodifield (George)	3·59
Knysna	2·52
Plettenberg Bay	1·71
Harkerville	2·64
Blaauwkrantz	3·91
Lottering	3·83
Witte Els Bosch	3·47
Cape St. Francis	4·03
Kruis River	2·84
Uitenhage (Gaol)	4·09
Do. (Park)	3·81
Do. (Inngs)	3·79
Armadale (Blue Cliff)	1·03
Port Elizabeth (Harbour)	2·56
Do.	7·48
Shark's River (Nursery)	2·82
Do. (Convict Station)	2·22
Centlivres	1·44
Edinburgh (Knysna)	3·61

V. SOUTHERN KAROO.	
Ladismith	2·92
Amalienstein	3·06
Calitzdorp	1·75
Oudtshoorn	2·24
Uniondale	1·25
Kleinpoort	2·43

VI. WEST CENTRAL KAROO :	INCHES
Fraserburg Road	2·03
Prince Albert	0·61
Zwartberg Pass	1·46
Beaufort West (Gaol)	1·91
Nel's Poort	1·46
Camfers Kraal	0·87
Krom River	1·18
Baaken's Rug	0·97
Willowmore	1·96
Rietfontein	1·53
Steytlerville	1·38

VII. EAST CENTRAL KAROO :	
Buffels Kloof	1·91
Aberdeen (Gaol)	2·04
Corndale	1·39
Klipdrift	1·54
Kendrew (Holmes)	1·43
Do.	2·00
Graaff-Reinet (Gaol)	1·21
Do. (Eng. Yard)	1·23
New Bethesda	1·33
Roodebloem	1·02
Glen Harry	1·41
Wellwood	0·66
Do. (Mountain)	0·90
Bloemhof	0·70
Jansenville	1·17
Toegedacht	1·04
Klipfontein	0·57
Pearston	1·16
Middlewater	0·37
Somerset East (Gaol)	3·43
Do (College)	0·89
Middleton	0·97
Spitzkop (Graaff-Reinet)	0·86
Bruintjes Hoogte	0·60

VIII. NORTHERN KAROO :	
Calvinia	0·84
Sutherland	0·56
Fraserburg	0·83
Carnarvon	2·23
Brakfontein	1·74
Victoria West	2·08
Doorskuilen	3·01
Britstown	2·18
Wildebeestkooij	6·08
Murraysburg	2·22
De Kruis (Murraysburg)	1·49
Richmond	2·25
Hanover	2·17
Theefontein	1·98
Philipstown	3·45
Petrusville	5·07
The Willows (Middelburg)	3·13
Middelburg (Gaol)	1·98
Do	1·91
Jackalsfontein	5·28
Ezelpoort	5·37
Plaatberg	4·63
Grape Vale	4·86
Ezelfontein	4·45
Roodepoort	5·34
Groenkloof	5·51
Vlakfontein	4·90

VIII. N. KAROO :—*continued.*	INCHES
Vogelsfontein	5·55
Plaatfontein	4·37
Colesberg	3·18
Tafelberg Hall	0·96
Fish River	1·11
Varkens Kop	2·12
Culmstock	1·79
Cradock (Gaol)	1·01
Witmoss	3·33
Maraisburg	4·55
Steynsburg (Gaol)	2·06
Hillmoor	3·28
Tarkastad	2·54
Do. (Dis. Engineer)	2·21
Waverley	2·62
Montagu	3·50
Rietfontein (Colesberg)	3·78
Schuilhoek	3·37
Vosburg	1·93
Zwavelfontein	2·47
Holle River (Colesberg)	5·40
The Meadows (Schoombie)	0·96
Cradock (Station)	1·41
Arundel (Colesberg)	3·78

IX. NORTHERN BORDER :	
Pella	1·11
Kenhardt	2·66
Upington	3·55
Trooilapspan	1·75
Van Wijk's Vlei	1·57
Prieska	3·18
New Year's Kraal	5·10
Dunmurry	3·50
Karree Kloof	2·72
Griquatown	2·33
Campbell	3·63
Douglas	4·03
Orange River	3·55
Newlands (Barkly West)	6·25
Barkly West	2·40
Bellsbank	8·43
Kimberley (Gaol)	2·97
Do. Stephens	3·30
Strydenburg	1·10
Rietfontein (Gordonia)	2·21

X. SOUTH-EAST :	
Melrose (Div. Bedford)	1·21
Dagga Boer	4·04
Fairholt	1·28
Lynedoch	1·45
Bedford (Gaol)	2·03
Do. (Hall)	1·83
Sydney's Hope	1·45
Cullendale	2·08
Adelaide	1·06
Atherstone	1·08
Alexandria	1·29
Salem	0·60
Fort Fordyce	2·61
Grahamstown (Gaol)	0·65
Heatherton Towers	0·26
Sunnyside	0·59
Fort Beaufort	1·99

X. SOUTH-EAST—*continued*	INCHES
Katberg	3 96
Seymour	3·89
Glencairn	2·67
Port Alfred	1·13
Hogsback	4 42
Peddie	0·87
Exwell Park	2·34
Keiskamma Hoek	2·17
Cathcart (Gaol)	2·00
Cathcart (Forest)	2·78
Thaba N'doda	2 60
Evelyn Valley	5·51
Crawley	2·19
Thomas River	3·82
Perie Forest	2 17
Forestbourne	3·26
Isidenge	1·95
Kologha	4·84
King William's Town (Gaol)	1·36
Do. (Dr. Egan)	2·20
Fort Cunynghame	4·12
Quacu	3·16
Blaney	1·65
Kei Road	1·68
Bolo	3·22
Fort Jackson	2·39
Prospect Farm (Komgha)	2·01
Komgha (Gaol)	2·68
East London West	1·39
Cata	4·63
Wolf Ridge	3·69
Dontsah	4·45
Mount Coke	1·45
Blackwoods	2·42
Albert Vale (near Bedford)	2·40
Heatherton Towers (Irrigation)	0·52
Huxley Farm (Stutterheim)	2·72
XI. NORTH-EAST:	
Venterstad	3·92
Burghersdorp (Gaol)	4·06
Ellesmere	4·07
Molteno	3·53
Lyndene	3·86
Cyphergat	3·28
Thibet Park	4·23
Sterkstroom (Station)	3·55
Do. (Gaol)	3·59
Rocklands	3·96
Aliwal North (Gaol)	6·53
Do. (Dis. Engineer)	7·31
Buffelsfontein	2·97
Carnarvon Farm	3·58
Halseton	3·60
Jamestown	4·59
Whittlesea	3·00
Rietfontein (Aliwal North)	3·66
Middlecourt	2·46
Dordrecht	5·97
Tylden	2·17
Herschel	6 64
Lady Grey	4 77
Lauriston	4·39
Lady Frere	5·44
Contest (near Bolotwa)	3·54
Sterkspruit	6·15
XI. NORTH-EAST:—*continued.*	INCHES
Palmietfontein	3.62
Rhodes	4·24
Albert Junction	3·62
Hughenden	1·56
Glenwallace	2·93
Indwe (District Engineer's Office)	2·60
Bensonvale Inst. (Herschel)	6·44
Cathcart (Queenstown)	2·68
XII. KAFFRARIA:	
Ida (Xalanga)	2·78
Slaate (Xalanga)	4·40
Cofimvaba	3·68
Tsomo	4·34
N'qamakwe	4·90
Main	3·26
Engcobo	8·15
Butterworth	4·67
Woodcliff	6·19
Kentani	2·53
Maclear	5·11
Idutywa	2·63
Bazeya	8·19
Willowvale	4·45
Mount Fletcher	5·22
Somerville (Tsolo)	3·46
Elliotdale	3 59
Umtata	4·60
Cwebe	2·70
Tabankulu	3·73
Mount Ayliff	4·14
Kokstad	4·01
Do. (The Willows)	4·09
Seteba	4·76
Flagstaff	3·52
Insikeni	7·51
Port St. John's	2·40
Umzimkulu	3·28
Wanstead	6·71
Maclear (Station)	6·61
Elliot (Station)	2·80
XIII. BASUTOLAND:	
Mafeteng	7·98
Mohalies Hoek	5·43
Maseru	5·01
Qacha's Nek	6·77
Leribe	4·01
XIV. ORANGE RIVER COLONY:	
Kroonstad	2 75
XV. NATAL:	
Durban (Observatory)	1·96
XVII. BECHUANALAND:	
Taungs	2·69
Vryburg	1·73
Mafeking	1 09
Setlagoli	2·13
Kuruman	3·29
XVIII. RHODESIA:	
Hopefountain	0·38
Rhodes Matoppo Park	0·94
XIX. DAMARALAND:	
Walfish Bay	00·0

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 27th April, 1907, ruling at the several centres named, is published for general information :—

CENTRE.	A. Wheat per 100 lb.	B. Wheat Flour per 100 lb.	C. Boer Meal per 100 lb.	D. Mealies per 100 lb	E Mealie Meal per 100 lbs.	F. Barley per 100 lb	G. Oats per 100 lb.	H. Oat-hay per 100 lb.	J Potatoes per 100 lb.	K Tobacco (Boer Roll) per lb.	L. Beef per lb.	M. Mutton per lb.	N. Fresh Butter per lb.	O. Eggs per doz.	P. Cattle (Slaughter)	Q. Sheep (Slaughter)
	£ s d	£ s d	£ s d	£ s d.	£ s. d.	s. d.	s. d	£ s. d	£ s. d	£ s d	s d	s d	£ s. d.	s d.		
Aliwal North ..	0 8 0	0 17 6	0 12 6	0 7 9	0 1 6	6 0	6 0	0 6 0	0 1 0	1/6 to 2-	0 8	0 6	0 1 6	3 0	£9	19/-
Beaufort West ...	0 10 6	0 15 6	0 12 6	0 9 6	0 12 0	9 0	9 0	0 5 9	0 7 6	0 0 10	*6d to 1/-	*6d to 7d	0 1 6	2 0	£15	22/-
Burghersdorp .	..	...	...	...	...	...	...	0 5 6	0 3 6	...	*0 9	*0 6	0 1 2	1 9	...	...
Cape Town ...	...	...	...	...	...	7 1	7 4	5/- & 4/10	0 6 8	...	...	...	0 1 3	1 7	..	...
Clanwilliam .	11/- to 12 -	...	12/- to 13/-	7/- to 10/-	...	7 0	8/- to 10/-	...	0 8 0	0 1 0	7d. to 8d.	6d to 8d	1/6 to 2/	1 3	...	...
Colesberg ..	...	...	...	0 12 9	...	...	...	0 6 6	3/9 to 8/-	...	..	...	8d to 1/-	1/6 to 1/9	...	...
Cradock .	...		1 0 0	0 7 3	0 6 0	5 0		0 5 7	0 4 0	0 0 6	0 6	...	0 1 0	2 4	£12	17/-
Dordrecht .	0 7 0	0 12 6	0 10 0	0 6 0	0 7 0	5 0	5 0	0 2 0	0 2 0	0 1 0	0 7	0 5½	0 0 11	1 9	£10	18/-
East London ...	0 10 9	0 10 9	0 10 9	0 5 9	0 9 6	5 0	8 9	0 4 0	0 5 0	0 1 6	*8d & †7d	*8d & †7d	0 2 0	2 3	£22	37/-
Graaff-Reinet .	0 8 6	...	0 7 6	7 0	...	5 0	5 0	0 4 0	0 5 0	...	0 5	0 6	0 1 0	1 6	£10	17/6
Graham's Town	0 6 6	...	...	6 6		4 9	6 6	0 5 3	0 5 0	0 0 7	0 7	0 7½	0 1 9	2 2	...	...
Kimberley .	0 10 0	0 14 6	0 12 9	0 6 0	0 7 0	8 0	8 6	0 6 6	0 17 0	0 0 7½	0 10	0 8	0 1 1	1 9	£10 to £12	16/- to 18/-
King Wm's Town	0 6 0	0 14 0	0 12 0	0 6 0	0 7 0	5 0	5 0	0 3 6	0 6 0	0 0 4	0 6	0 6	0 1 0	2 3	£10 to £15	25/- & 17,6
Malmesbury ..	0 7 9	1 0 6	1 0 0	0 7 6	0 7 6	7 6	6 6	0 4 6	0 12 6	0 1 0	0 7	0 6	0 1 6	1 6	£12	21/6
Mossel Bay ..	0 10 0	0 13 0	0 12 0	0 15 0	...	5 0	5 0	0 5 0	0 15 0	0 1 0	0 8	0 9	0 2 0	1 6	...	...
Port Alfred ..	0 8 6	0 16 0	0 15 0	0 6 0	0 13 0	5 0	6 0	0 3 0	0 5 0	0 0 6	0 8	0 8	0 1 6	1 6	...	...
Port Elizabeth ..	0 7 0	...	...	0 6 0		1 3	6 6	0 1 6	0 7 6	...	0 7	0 7½	0 1 1	2 3	...	...
Queen's Town ...	0 5 0	0 9 0	0 1 6	0 4 0	0 4 0	4 0	6 6	0 3 6	0 1 0	0 1 0	*0 6	*0 6	0 0 9	2 0	£12 to £15	20/- to 28/-
Tarkastad ..	0 12 0	0 11 0	0 13 0	0 8 0	9 6	5 6	10 0	0 6 0	0 5 0	0 1 0	*0 6	*0 6	0 0 9	1 4	£10	20/-
Vryburg ..	0 11 0	0 12 6	0 14 0	0 7 6	0 9 0	10 0	10 0	0 8 0		...	...	...		...	...	...
Worcester ...	0 8 9	0 13 6	0 10 0	0 5 0	0 9 0	7 6	7 0	0 4 0	0 6 0	0 0 6	*6d to 10d †6d to 9d	*6d to †7d †5½d to 6d	0 1 6	1 6	£9 to £12	22/- to 25/-

NOTE.—A blank space denotes "no transactions   *Colonial   †Imported

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town. Members of Farmers' and Fruit Growers' Associations applying for same through the Secretaries of these Associations are supplied free of charge.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V of *Agricultural Journal.*

Artificial Grasses and Fodder for Stock; Ensilage; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry; Locusts and their Destruction; Possible New Industries for Cape Farmers; Dairying; Fruit Culture (6d.)

Agriculture.

Wheat Production in Australia (1s. 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s. 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A. W. Heywood; *Brak Land in Relation to Irrigation and Drainage (1d.); The Velvet Bean (1d.); Potato Disease (1d.); Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d.); Sundry Forage Crops for trial in Cape Colony (1d); Poultry in South Africa: Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.); Tobacco Culture by P. Bornemisza (1d.); The Cultivation of Tobacco in the Colony by K. Schenck (3d.); Tobacco Wilt in Kat River Valley (1d.); *The Process and Appliances for the Flue Curing of Tobacco. (3d.)

Dairying.

Dairy Breeds by A. C. Macdonald (9d.); *Dairy Industry in Great Britain by A. C. Macdonald (6d.); *Dairy Industry in Denmark (2d.); Ready Reckoner for Cream Testing (1s.); †Dairy and its products by D. Hutcheon (2d.); *Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.); Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d.); *Codling Moth (1d.); Fruit Fly (1d.); Fumigation Supplies (1d.); Insect Friends and Foes (1d.); Methods of Locust Destruction (1d.); *Peach Yellows (1d); Pear Slug, Paris Green (1d); Remedy for Mestwurmen (1d.) *Spray Calendar (1d.); *Spray Pump Notes (1d.); Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d.); Tree Fumigation in California (1d.); Winter Spraying (1d.); Wattle Bag Worm (1d.); Bordeaux Mixture (1d.); Deaths Head Moth Superstition (1d.); Fumigation under Box Covers (1d.); The House Fly (1d.); New Oak Tree Pest (1d.): Nursery Inspection and Quarantine Bill (1d.); Potato Tuber Moth (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d.); Gall Worms in the Roots of Plants (1d); The Fruit Fly,* (with coloured plates) (3d.); Another Introduced Scale Pest (1d.); Washes for Red Scale (1d.); Fruit Fly: Peach Fly (1d.); Lime - Sulphur - Salt Wash for Scale Insect (1d.); The Fruit Moth (1d.); Fusicladium of the Apple and Pear (1d.); Mealie Stalk Borer (3d.)—*coloured plate*; Cleaning up Nursery (1d.); Natural Enemies of the Fruit Fly: Report on Investigations in Brazil (1d.); Locust Birds and Locust Poison (1d.); The Brazil Fruit Fly Parasites (1d.); Cyanide Gas Remedy for Scale Insects (3d.); Arsenate of Lead (1d.); The Antestia Fruit Bug (1d.); Caterpillars Destroying Trees (1d.)

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d.); †Elementary Principles of Sylviculture or Woodcraft (1d). National Forests (1d.); Indigenous Timbers of the Cape (1d.); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.); Tree Planting for Farmers (1d.)

Note.—All those marked with * are obtainable in Dutch and English.

† Dutch only.

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d.); Portable Floating Hatching Box for Trout Ova (1d.) The Protection of Trout (1d.); The Ocean and its Resources (1d.)

Horticulture

Fruit Culture in the Gamtoos River Valley (1d.); *Marketing of Fruit (1d.); The Olive at the Cape (2d); Tomatoes and Fruit for Export (1d.); Citrus Culture in Cape Colony: Report of the Citrus Commission (1d.); *Fruit from Orchard to Buyer (1d); Netting for Fruit Trees (1d.); Fruit Culture in Argentina (1d.); Vegetables for Exhibition (1d.); Chrysanthemum Rust (1d.)

Veterinary and Animal Industry,

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d.); * Heartwater (1d); *Malarial Catarrhal Fever of Sheep (1d.); Rinderpest: Dr. Koch's Report (1d.); *Inoculation against Rinderpest (1d.); Dr. Kohlstocks Report on Inoculation for Rinderpest (1d.);*Redwater, Texas Fever or Tick Disease (1d.); *Redwater, Anthrax and Quarter Evil (1d.); *Sheep and Wool (1d.); The Eye and its Diseases (1d.): Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.); Tick Heartwater Experiments (1d.); Indigestion and Diarrhœa in Calves (1d.); Persian Sheep and Heartwater (1d.); Poisoning of Stock (1d.); Retention of the Fœtal Membrane, or Afterbirth in Cows (1d); Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d.); Tuberculosis and the Use of Tuberculin (1d.); African Coast Fever with Description of Dipping Tank (3d.); *Rinderpest in South Africa (3d.) by D. Hutcheon; *Fluke or Slak in Liver of Sheep (3d.)—*coloured plate*; *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.); Osteo Porosis (3d.)—*coloured plates*; *Glanders (3d)—*coloured plate*; *Animal Castration (1d.); *Preventive Inoculation for Redwater (1d.); * Abortion in Cattle (1d.); Treatment for Worms in Domestic Animals (1d.); *Lungsickness of Cattle, Contagious Pleuro-Pneumonia, or Pleuro-Pneumonia-Bovum-Contagiosa (1d.); *Swine Fever, Hog Cholera or Pig Typhoid (3d.)—*coloured plates*; Castration of Females and Animals other than the Horse (1d.); Poisoning of Horses by *Ornithogalum Thyrsoides* or Chinkerinchee (*coloured plate*) (3d.); Horse Sickness by D. Hutcheon (2d.); Ticks and Afrian Coast Fever (1d.); Cirrhosis of the Liver in Stock (1d.); Liver Disease among Calves (3d.); The Arsenite of Soda Dipping Mixture (1d.); *Lampas; Preventive Vaccination against Anthrax.

Viticulture.

†Reports on Viticulture (3d.); *Reconstitution of Phylloxerised Vineyards (1s.); Report on Failure of Hanepoot Grapes on American Vines (1d.); The Making of Wine and its By-Products (6d.); How to Treat Wine Casks (1d.); Failure of Vines (1d.); Manufacture of Dry Wines in Hot Countries (3d.); Anthracnose in Constantia (1d.)

Miscellaneous.

Game Seasons (3d.); Land Laws of Cape Colony (1d.): †Monsonia: the Cape Cure for Dysentery (1d.); *Rainfall of South Africa (1d.); Sand Dunes of Gascony (5d.); The Metric System (1d.); South African Stud Book, Constitution, Rules, &c. (1d.); Bars in Ostrich Feathers (1d.); *Information regarding the Mining Laws. (1/-.); The Preservation of Game in Cape Colony.

NOTE.—All those marked with are obtainable in Dutch and English.
† Dutch only.

THE PRODUCE MARKET.

CAPE TOWN.

Mr. R. Muller, of Strand Street, Cape Town, reports for the month ending April 30th:—

Ostrich Feathers.—The London Sales were held on the 8th of April, when 3,326 cases were offered, which included three from Australia and 201 from Egypt. Whites, Feminas and Spadonas advanced about 5 per cent. Fancy, White Tails, best Long and Medium Blacks and Drabs also shared in the advance, while common qualities of Short and Floss were lower.

	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Super Firsts	17	10	0	35	0	0	Floss	0	5	0	1	10	0
Firsts, Ordinary to Super	11	0	0	14	10	0	Long Drabs	2	10	0	4	0	0
Seconds	8	0	0	9	10	0	Medium Drabs	1	5	0	2	0	0
Thirds	6	0	0	7	10	0	Short to Medium	0	10	0	1	15	0
Femina, Super	12	0	0	16	0	0	Floss	0	2	6	1	10	0
Femina, Seconds to Firsts	5	10	0	10	10	0	White Tails	1	15	0	3	15	0
Byocks (fancy)	5	10	0	9	10	0	Coloured Tails	0	10	0	2	10	0
Long Blacks	3	10	0	7	10	0	Chicks	0	1	0	0	2	0
Medium Blacks	2	0	0	3	0	0	Spadonas	2	10	0	5	0	0
Short to Medium	0	10	0	2	10	0	Inferior Black and Drabs, short to long	0	0	6	1	10	0

Wool.—There is no change to report in our market. Prices remain firm for all good quality. Combing and Lambs' Wools of light description, white, heavy and wasty parcels are difficult to move. Malmesbury and Piquetberg Grease Wools shewed very poor quality, and continue difficult of sale. Snow-whites are in good demand at previous rates.

	s.	d.	s.	d.		s.	d.	s.	d.
Super long Grass Veld	0	8	0	10	Snow-white, Super to Extra	1	7	1	10½
Do. Karoo	0	6¾	0	8	Do. Ordinary	1	1	1	6½
Medium	0	5	0	6	Fleece, washed	0	0	0	10
Short and Inferior	0	4	0	4½					
Wool for washing	0	4½	0	6					

Mohair.—There is no new feature in the Mohair market. Firsts are enquired for at from 14d. to 14½d., according to quality, but sellers are holding with a view of doing better. Kids may be quoted from 17½d. to 18d., Winter Hair from 10½d. to 11½d., and Winter Kids from 13½d. to 14½d., according to quality.

	s.	d.	s.	d.		s.	d.	s.	d.
Firsts, Summer	1	1½	1	2½	Winter	0	10½	0	11½
Kids	1	4	1	8	Do. Kids	1	1	1	2½
Seconds	0	6½	0	10					

Hides and Skins.—The market is unchanged, except for Goat Skins, which declined ½d. per lb. for sound qualities, and from ½d. to 1d. for any damaged.

PORT ELIZABETH.

Messrs. J. Daverin and Co. report under date April 26th:—

Ostrich Feathers.—The market was again heavily supplied this week with a fair average assortment. Competition was very strong for all super quality Whites, Feminas, Blacks, Drabs, Tails and Spadonas, and extreme prices were paid, but for ordinary parcels the tone of the market was wanting in confidence,

R. MÜLLER, 77, STRAND STREET, CAPE TOWN,

Pays HIGHEST prices for:—

WOOL, OSTRICH FEATHERS,
MOHAIR, SKINS, HIDES,
and other PRODUCE.

R. MÜLLER, Cape Town,

Supplies Best MERINO RAMS and EWES.

Bankers: African Banking Corporation.

P.O. Box No. 133. Telegrams: RELLUM, Cape Town. Telephone No. 180.

R. MÜLLER,

77, Strand Street, CAPE TOWN.

BENNIE & COMPANY,

Produce Merchants,
Forwarding and Commission Agents,

Market Street, Kimberley

CONSIGNMENTS of Produce, Fruit and Live Stock received and sold on the Market, or out of hand, to best advantage, followed by prompt remittance.

FORWARDING to any part of the Country carried out, with all expedition.

PRODUCE of all Kinds bought for Cash, Large Stocks held in our Stores.

BONE MEAL.—We have been appointed *Government Agents for Kimberley District.* Large or small quantities can be supplied to Farmers at cost price.

CORRESPONDENCE INVITED.

Telegrams: BENNIE—KIMBERLEY *P.O. Box 59.*

and prices at times were very irregular; this was most marked in the case of discoloured lots. A limited business has been done out of hand, but sales are difficult to make. buyers shewing little inclination to follow the high prices paid on the market. The present high level of prices is entirely due to the extraordinary demand from America, which demand may be curtailed at any time. London advices are to the effect that prices are dangerously high, and that the Home trade does not warrant anything like current rates. We would. therefore, recommend farmers to forward their pluckings as soon as possible, in order to take the full advantage of the high prices ruling at present. Stocks held here now are very heavy, and the quantity entered for market is so large that entries made to-day will not come on for four weeks. The total quantity sold on the public market this week amounted to £13.726 9s. 1d., and weighed 4,227 lbs. 10 ozs.

	£	s.	d.	£	s.	d.
Primes: Extra super	Special Prices.					
Good to Super ..	15	0	0	20	0	0
Whites: Firsts	11	0	0	15	0	0
Seconds	7	10	0	11	0	0
Thirds	3	0	0	7	0	0
Feminas:						
Super	11	0	0	16	0	0
Firsts	8	10	0	11	0	0
Seconds	5	0	0	8	0	0
Thirds	2	10	0	4	0	0
Greys	4	10	0	8	0	0
Fancy	5	10	0	9	0	0
Tails: White	1	10	0	3	15	0
Light	1	5	0	3	0	0
Coloured & Dark..	0	5	0	1	2	6

	£	s.	d.	£	s.	d.
Blacks: Long	3	0	0	5	10	0
Medium	1	5	0	2	10	0
Short	0	10	0	1	0	0
Wirey	0	1	0	0	1	0
Floss	0	6	0	1	5	0
Drabs: Long	1	10	0	4	0	0
Medium	0	12	6	1	0	0
Short	0	2	6	0	6	0
Wirey	0	0	6	0	1	0
Floss	0	6	0	1	5	0
Spadonas: Light .	1	15	0	5	0	0
Dark	0	10	0	2	10	0
Chicks..	0	0	3	0	2	6

Wool.—The Antwerp sales took place this week, and prices are reported as ¼d. lower for Merinos. Our market remains steady, but only a limited amount of business has been done in the open market during the week, our sales of 800 bales being the most important. On the public market yesterday a large quantity was offered, prices shewing no change. The London sales open on Tuesday next, when it is generally expected prices will shew little change.

	d.	d.
Snow-white, Extra Superior	20	21½
Do. Superior..	18	20
Do. Good to Superior..	16½	17½
Do. Inferior Faulty ..	16	16½
Grease, Super long, well-conditioned, Grassveld grown (special clips).	9½	10
Grease, Super Long, well-conditioned, Grassveld grown..	8	9
Grease, Super Long, well-conditioned, Karoo grown (special clips)	7½	8
Grease, Super Long, well-conditioned, Karoo grown..	6½	7
Grease, Super Long, well-conditioned, Mixed Veld	5¾	7
Grease, Light, faultless, medium, Grasveld grown	6½	7¾
Grease, Light, faultless, medium, Karoo grown	6	6¼
Grease, Light, faultless, short, Karoo grown ..	5½	5¾

	d.	d.
Grease, Short, faulty and wasty	5	5¼
Grease, Coarse and Coloured	4¼	4½
Scoured, Coarse and Coloured	6½	12
Basuto Grease, short.. ..	7	7½
O. R. C. Grassveld Grease, long and well-conditioned (special clips)	7½	8
O. R. C. Grassveld Grease, long and well-conditioned	6½	7¼
O.R.C. medium grown, light, with little fault	6	6½
O.R.C. short, faulty and wasty	5	5¼
O.R.C. Karoo grown, long and well-conditioned	6¼	6¾
O.R.C. medium grown, light, with little fault	5	6
O.R C. short, faulty and wasty	4½	5

Mohair.—This market continues very quiet, and little business has been done in the open market; a few sales of new season's Kids have been made at 16½d. to 17½d., but no business has been done in Summer Firsts. On the public market on Tuesday a large quantity was offered to a very dull market, and the bulk of the offerings had to be withdrawn owing to the want of competition.

	d.	d.		d.	d.
Super Kids	18	18	Mixed O.R.C. Hair, very mixed	10	10½
Ordinary Kids	16	17	Seconds and Grey	8	9
Superior Firsts (special clips),..	14½	14½	Thirds	6	6
Ordinary Firsts	14	14	Winter Kids (special clips)		14½
Short Firsts..	13	13½	Winter Kids (good ordinary)	13	14
Superfine Long Blue, O.R.C. Hair (nominal)	14	14½	Winter Hair	11	11½
Mixed O.R.C. Hair (average)	11	11½			

Skins.—Sheepskins sold this week in bundles at 7¼d. per lb.; Pelts, 6¼d.; Capes, 2s. each; damaged, 6d. each: Goat, 13d.; damaged, 6¼d. per lb.; Angoras, 9¼d.; Shorn, 6½d.; damaged, 4½d. per lb.

Hides.—Sundried sold at 9d.; damaged, 6d. per lb.; Dry-salted, 7¾d.; damaged, 5¼d. per lb.: Madagascar hides, 7d.; damaged, 5½d. per lb; Thirds, 3½d. per lb.

Horns.—Parcels sold all round at 3½d. each.

BREEDERS' DIRECTORY

AND GENERAL FARM NOTICES.

Notices under this heading are inserted at the rate of one penny per word per issue; minimum charge 2s. 6d. Payment must accompany order. Six consecutive insertions 10% discount; twelve 15% discount. Cheques and P.O.O. to be made payable to the Accounting Officer, Department of Agriculture, Cape Town.

CATTLE.

HEREFORDS.

Young bulls for sale, sired by "Chain Armour" ("Armour Plate," 19838,—"Patience"). First prize winner Port Elizabeth and East London Shows, 1905-1906. Mr. B. Webb, Arundel Stud Farm.

JERSEYS.

Thoroughbred Herd. Celebrated Island bred bull "Clove," and several of the best cows and heifers from Mr. H. W. Struben's late herd.—Mrs. A. A. Dunn, De Tuin, Piquetberg.

Thoroughbred pedigree bulls for sale, from Imported or Colonial bred prize stock, good milking strain. For particulars, apply to Superintendent, Porter Reformatory, Tokai, P.O. Retreat.

FRIESLANDS.

Pure Frieslands. Enquire for cows, young bulls, and heifers. Oldest pure herd in Eastern Province. Grand milkers. Prize stock. Also, Colonial Rambouillet Flock Rams, limited number.—F. F. Wienand, Bellevue, Bedford, C.C.

R. Cross, Hillside, P.O. Bolotwa. Has high-class Friesland bulls for sale. Herd may be seen by appointment. Bulls from Imported and Colonial Cows.

SHEEP.

MERINOES.

Rambouillet Rams, from Colonial Ewes by Imported and Colonial sires. Sold at all Bedford Ram Fairs. Partridge Wyandottes and Indian Runner Ducks' Eggs.—Pringle Bros., Glen Thorn, P.O. Linton, Adelaide.

R. Pell Edmonds, Ripplemead, Dohne, Breeder of Pure-bred Pedigree Merino Sheep and Pedigree Black Welsh Cattle. —For particulars, see page xxxviii.

HORSES.

For Sale.—Imported Cleveland Stallion: sire, Pitch & Toss, 3 years champion in succession; foaled 1897. Royal Horse Show Prize Winner. Quiet to ride and drive; tried at stud. A bargain. W. J. Walsh, Klein River Estate. P.O. Stanford, Caledon, C.C.

PIGS.

Berkshire pigs, thorough bred, pedigree, boars and sows, from Imported stock, winners of numerous prizes. For particulars, apply to, Superintendent, Porter Reformatory, Tokai, P.O. Retreat.

OSTRICHES.

Specials only.—Chicks, £5 to £20 each; Young Birds, £10 to £30.—F. W. Baker, Laughing Waters, Willowmore.

GENERAL.

H. Vermaak, The Pines, Maraisburg, Cape Colony, has on hand and for sale at very reasonable prices, PURE-BRED FRIESLAND BULLS and PURE-BRED MERINO RAMS of the RAMBOUILLET breed.

THOROUGHBRED PERSIAN RAMS and OSTRICHES.—Hougham Abrahamson Long Hope Siding, C.C. Breeder of Rams from progeny of ewes passed into Stud Book. of Cape Breeders' Association. Also selected Breeding Ostriches.

PASPALUM GRASS PLANTS.—Quotations for plants, in bags free on rail Stellenbosch (keep moist long distance). See *Agricultural Journal*, May, 1906, page 622, or from A. C. Buller, Dwarsriviershoek, Stellenbosch.

PURE BRED ANGORA GOAT RAMS.

Bred from the Choicest Strains, and Prize-winners at the leading Agricultural Shows of Cape Colony. For particulars apply to A. B. Hobson, Martyrsford, Jansenville.

PERSIAN SHEEP AND OSTRICHES.

S. Montague Gadd, Springfield, Tafelberg. Orders booked for young rams, from Stud-book Ewes and for Ostrich Chicks from the best strains in the country.

THE POULTRY YARD.

PRIZE and UTILITY POULTRY of the BEST ENGLISH and AMERICAN STRAINS.—SOUTH AFRICAN BRED. —Hardy, Healthy, Vigorous, Egg Production a Speciality. WHITE LEGHORNS—BROWN LEGHORNS —BUFF LEGHORNS — WHITE WYANDOTTES — SILVER PENCILLED WYANDOTTES—BARRED PLYMOUTH ROCKS. Stock & Eggs for Sale in Season.—Correspondence invited.—S. Smith, Talana, Wellington Avenue, Wynberg.

BUFF ORPINGTONS.

THE FARMER'S FOWL. The fowl that LAYS WHEN EGGS ARE TOP PRICE and are also A 1 table birds. My Buffs have unlimited orchard and grass run, and are noted for hardiness and good laying qualities. Young stock always for sale at very reasonable prices. Ask for inclusive quotations; carriage paid to any station in South Africa and AT MY RISK to rail destination. My list of prizes won at shows all over South Africa will convince you that this unrivalled *Colonial* strain of 9 years' standing CAN HOLD ITS OWN AGAINST IMPORTED STOCK. Buy hardy Colonial-bred birds and save your pocket. Eggs from pure-bred utility strain, 12/6. Address: A. C. Buller, Dwarsriviershoek, Stellenbosch.

TURKEYS.

MAMMOTH AMERICAN BRONZE.—HARDY STRAIN OF GREAT SIZE. Noted prize winners. Young stock for sale after April. Orders booked now. Ask for inclusive quotations. Carriage paid to any station in South Africa and AT MY RISK to rail destination. Eggs in season. Full particulars from A. C. Buller, Dwarsriviershoek, Stellenbosch.

The Late DIRECTOR of AGRICULTURE
D. HUTCHEON M.R.C.V.S.

THE Agricultural Journal

OF THE CAPE OF GOOD HOPE.

No. 6. JUNE, 1907. VOL. XXX.

Published Monthly in English and Dutch by the Department of Agriculture and distributed gratis to bona fide farmers in the Cape Colony on application through the Resident Magistrate of the District.

Advertising.—Approved advertisements are inserted. Full particulars can be obtained from the Sole Advertising Contractors, the CENTRAL NEWS AGENCY, LTD., 125-127, Long Street, Cape Town, P.O. Box 9, Telephone No. 438, Telegraphic Address, "Periodicals," to whom also all accounts must be paid.

Postal Address:

The Editor "Agricultural Journal," Department of Agriculture, Capetown

Telegraphic Address: "Bulletin," Capetown.

CONTENTS.

PAGE.

OBITUARY—D. Hutcheon, M.R.C.V.S. 736

NOTES— 740

Crowded out.—Duplicate *Agricultural Journals.*—Government Guano—Economical Wagon Wheels.—Egg-Laying Competitions.—Cape Dried Fruits in Holland.—Heartwater.—Natal Prohibits Fruits infected with Codlin Moth—Dodder and Lucerne.

FARM AND VELD— 744

A Remarkable Case.—The Castration of Ostriches.—Lucerne Cultivators.—Winter Irrigation of Fruit Trees.—Sawdust as Manure.—Drainage and Orchards.—The Vegetable Garden.

A TREATISE ON CITRUS CULTURE FROM SEED TO FRUIT. (*Illustrated.*) By W. E. Masters 751

BILIARY FEVER IN DOGS. By the late D. Hutcheon, M.R.C.V.S. 764

DODDER AND ITS ERADICATION. (*Illustrated.*) By Dr. Eric A. Nobbs 775

PRESIDENTIAL ADDRESS TO THE CAPE CHEMICAL SOCIETY. By Prof. P. D. Hahn, Ph.D., M.A. 78

RETURN OF FRUIT SHIPPED FROM CAPE COLONY TO ENGLAND DURING APRIL, 1907 ... 790

EXPERIMENTS WITH OSTRICHES, II. (*Illustrated.*) By Prof. J. E. Duerden... ... 791

REPORT OF DAIRY TEST AT MOLTENO AGRICULTURAL SHOW 794

SPECIFICATION OF HORSES REQUIRED BY MILITARY AUTHORITIES 800

BOTANY. By F. W. FitzSimons, F.Z.S., F.R.M.S., etc. 802

EASTERN PROVINCE BOARD OF HORTICULTURE 807

NATIONAL WOOL AND MOHAIR GROWERS' ASSOCIATION 813

PROPOSED AGRICULTURAL CREDIT SYSTEM 817

WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION ... 820

CORRESPONDENCE 822

Show Wines and Analysis—Lamziekte—The Southern Ostrich—Bare Fallows—The Divining Rod not a Fraud—Banana Fibre from East Africa—Lime and Sulphur, and Wool—Cures for Snake Bite—Water Drills and Water boring—Horse Sickness—The Classification of Sheep at Shows—Diarrhœa in a Horse—Wooly Aphis or Apple Blight—The Teachings of Experience—Failure of Peaches, &c.

RURAL REPORTS 833

NOTES ON THE WEATHER OF APRIL, 1907 835

RAINFALL RETURNS, APRIL, 1907 839

DEPARTMENTAL PUBLICATIONS 842

THE PRODUCE MARKET 844

Obituary.

The Late Director of Agriculture, D. Hutcheon, M.R.C.V.S.

By the death of the late Director of Agriculture, on the 14th of last month, South Africa has sustained an irreparable loss. He was not only a great authority on animal pathology, but a deep and earnest student of all the problems which face those who undertake to engage in agricultural pursuits in this country. That his death came as a great shock to the whole community, and was felt throughout the length and breadth of the land, was amply demonstrated by the marked expressons of public regret exhibited at the time; but it is only those who have been intimately associated with him who can appreciate to the full the value of the man and the really great work he has accomplished and endeavoured. From the moment Mr. Hutcheon came to South Africa to the day he left his office, never to return, he was engaged in a continuous struggle against forces which more than once threatened to overwhelm one or other section of the agricultural community. Fortunately for South Africa he was possessed of a great and enduring courage as well as a firm belief in the magnitude of the truths it was his duty to inculcate, and though, on occasions, he knew he was carrying his life in his hands, he fearlessly persisted with his work, looking only to the goal ahead and ignoring the incidents by the way.

His earlier experiences in this country were far from encouraging. He came here, after a brilliant college and professional career in Scotland, England and Ireland, to take up the duties of Colonial Veterinary Surgeon. He stood, as it were, alone in a wilderness. In those days veterinary science was little known to the average South African farmer, and for many years he had to struggle against prejudices and discouraging criticism, founded on open distrust, which would have disheartened the majority of men. In the end, however, he conquered, and to-day the services of the veterinarian are eagerly sought where they were despised as useless but a few years ago.

The only reward he ever hoped for was that some day he might be placed in a position to give this country the full benefit of the knowledge he had acquired during the lengthy and strenuous period he had devoted to its service. That opportunity came. but, unfortunately, it came too late. As Director of Agriculture, he was placed in such a position. This office was quite unsought. and for some time he hesitated to accept it: for his one ambition, as read by himself, was to be able to devote his attention entirely to veterinary work in the interests of this country quite untrammelled by any other consideration. And. unfortunately, when he took up the post of Director, he was beginning to be handicapped by failing health. A wide field was now before him, and. in spite of warnings which would have caused other men to pause, indications and indispositions which told him that even his iron frame was beginning to be shaken. he threw himself with unflagging energy into the duties he was called upon to fulfill, and by persistent attendance at his office. early and late, and by moving about freely among the farmers. he succeeded in getting through an enormous amount of work. It was only when collapse was imminent that he acknowledged defeat, and then it was too late. for the end came only too rapidly. He was in his office on the 7th of May, on the 14th he had passed away for ever. His charming personality and beautiful disposition gained for him a whole host of friends in every part of South Africa, while in most of the pastoral districts his name was. and will remain for many years to come. a household. word. He has left behind a number of writings on stock diseases in this country, and was engaged on the compilation of what he hoped would have been the crowning effort of his life, a *magnum opus* in the shape of a complete work based on the result of his investigations. when death intervened.

The loss of such a man at such a peculiar juncture amounts almost to a national calamity; and by none is that loss felt more than by those who have been associated with him in his official duties. To all he was ever a sympathetic and a wise friend. but to the officers of this Department he was much more His wide knowledge, his wisdom and tact, his unselfish generosity and love of justice, will keep his memory green for ever with all who have had the privilege of serving under him. He laid the foundations f scientific knowledge of the stock diseases peculiar to this country. and always encouraged his subordinates to further efforts in that direction. He never sought honours or distinction. and to the roll of his early academic successes added nothing but the title of Hon. Associate of the Royal College of Veterinary Surgeons, a distinction conferred upon him by that body in 1902 as some recognition of his great services to veterinary science.

Mr. Duncan Hutcheon was born near Peterhead, in Scotland, in 1842, and received his early education at the parish school of Old

Meldrum, Mollison's Academy, Aberdeen, and at some privately-conducted evening classes. He began life as an agricultural assistant, and it was in this capacity that he obtained his first experience in the care of livestock. In 1858, he joined the Dick Veterinary College, Edinburgh, where he soon distinguished himself, obtaining the Dick Bursary of £30 per year for three years, at the close of the first session, the conditions attached being that for the whole period he should occupy the position of assistant to the principal, Mr. H. Williams. In 1871, he obtained the diploma of the Highland Agricultural Society, also that of the Royal College of Veterinary Surgeons, passing with distinction, and winning the silver medal for anatomy, physiology, chemistry, materia medica, and hippopathology, and the Highland Society's medal for the "Best general examination."

On leaving College, he practised for a time with Messrs. Pollock and Sons, in Edinburgh, and in 1872, he conducted a practice in Limerick for Mr. O'Connor. In the following year he joined Mr. Arthur Santy as assistant at Castle Meadow, Norwich, then one of the largest practices in the Eastern counties.

After two years' work there he was appointed veterinary surgeon to the Liverpool Omnibus and Tramway Co., where he remained until leaving to take up a position as Colonial Veterinary Surgeon to the Cape Government on March 2nd, 1880. He had only been in South Africa a year when the outbreak of pleuro-pneumonia in Angora goats, introduced from Asia Minor, called for his special attention. This disease broke out in 1881, and proved most destructive. Had it not been for Mr. Hutcheon's measures in carrying out preventive inoculation on an extensive scale, in conjunction with strict quarantine regulations, the whole Angora goat industry in South Africa would have been imperilled. He received the thanks of Parliament for this work, together with a special bonus, and was presented by the Angora farmers with a gold watch and chain, a large gold cup, and a binocular microscope.

From that time onward he devoted all the time to investigation work he could spare from his general duties. It was he who first determined "blue tongue" in sheep (malarial catarrhal fever) as a specific disease, and under his directions Mr. Spreull succeeded in producing a preventive serum for immunising sheep against that disease. In 1883-4 came the terrible wave of redwater in cattle, which threatened to render cattle farming impossible in the eastern-coastal districts. Then came heartwater in sheep, and at that time, as the part the tick played was unknown, the whole position looked hopeless.

Fearless and untiring were his labours in those days, and they laid the foundation for the more complete work carried out later when Mr. Lounsbury took up his share of the investigations, and our farmers were made aware of the devastating influence of the tick.

But probably the most strenuous of the many campaigns the late Mr. Hutcheon waged on behalf of the farmers of this Colony was that against rinderpest, when that fell disease broke out in 1896. He directed and controlled the struggle to keep it in check, seemingly indefatigable and inexhaustible. He covered thousands of miles of country, and did everything that was humanly possible to hold it back pending the discovery of some system of rendering cattle immune. The methods of inoculation were ultimately introduced when the pressure on the Colonial Veterinary Surgeon and his staff was eased. He was appointed Acting Director of Agriculture in August, 1905, that appointment being confirmed the following year.

NOTES.

Crowded Out.

The indulgence of readers and contributors is claimed this month on account of the several important and interesting articles and letters for which it has been found impossible to find space. Among other matters omitted are reports of the Fruit Congress and the Congress of the Agricultural Union, as well as continuations of the Rural Cape Colony Series. It is hoped to find room for these next month.

Duplicate "Agricultural Journals."

As there is some reason to believe that duplicate copies of the *Agricultural Journal* are being delivered in some cases, those who may be in receipt of such are requested to kindly return them. All that is necessary is to write across the wrapper the words "Duplicate—Returned," and replace them in the post. The duplication has arisen in some cases through the same name having been sent in from different sources, and with a change in initials, or, as was found in one case, the initials in one and the full name in another.

The issues for the earlier months of this year are greatly in demand, and anyone having spare copies of January, February and March (English) would confer an obligation by returning same to this office. By enclosing them in a wrapper and addressing "O.H.M.S. The Editor, *Agricultural Journal*, Department of Agriculture, Cape Town," there will be no need to stamp them for posting.

Government Guano

As in future the system of mixing all guano from the Government Islands is to be adopted, so as to make it of an approximate uniform grade, notice has been published that the supply of Rock Guano is to be discontinued from July 1st.

Economical Wagon Wheels

Since the publication in the April issue of the notes on the economical wagon wheels introduced into Rhodesia we have had many enquiries from farmers as to where they could be obtained.

In response to a letter the Secretary for Agriculture, Salisbury, has kindly informed us that several farmers there have imported these wheels from the Electric Wheel Company of Quincy, Illinois, U.S.A., through a local agent, Mr. J. Kapnek, of Salisbury. The wagons, he states are giving satisfaction and are considered to be very suitable for heavy, sandy or boggy roads. Illustrated catalogues giving prices and the fullest particulars are obtainable of the Electric Steel Wheel Co.

Egg-Laying Competition.

The Egg-laying Competition inaugurated by the Western Province Agricultural Society is coming to a close, but it has been so successful that the Society has decided to start another one commencing in May next to extend over twelve months. Full particulars will be published later. In the meantime a six months' competition will be started on July 15th, and entries for this must be sent in to the Secretary by the 5th of July. There are only 24 pens available and two of these are being reserved for "boer" fowls, the others will be open to any pure breed. In case of the entries exceeding the number of pens the latter will be allotted by ballot. The pens must consist of four hens hatched in South Africa, the date of hatching to be given, but there will be no limit as to age. The prize is to be given to the pen producing the greatest weight of eggs during the competition. If a bird dies during the first month the owner is to be at liberty to replace it, foregoing any score made by the dead bird. Entry fee, non-members of the Society, £1, members 5s.

Cape Dried Fruits in Holland

As a result of the Exhibition of South African Products in Amsterdam, enquiries have been received by the Agricultural Department for Cape Dried Fruits from several firms of standing. These include Messrs. M. Sohn, Gebrs. De Vries, T. Tas Enz, A. Stall M. zn, and A. B. Pastening, all of Amsterdam. They ask for Sultanas, Apricots, Prunes, Apples and Raisins, and from the tenour of the various communications, they seem to think that good business should result from their introduction to that market.

Heartwater.

Mr. Jesse Long, of Eschol, Salem, writes asking us to publish the *post-mortem* appearances of a pure or uncomplicated case of Heartwater in sheep. On making a post mortem examination, the principal symptom is the presence of clear yellow fluid in the pericardium (the bag which surrounds the heart). The heart itself is usually pale but otherwise normal. The quantity of fluid varies considerably. As much as ten fluid ounces has been found, although usually the amount is less. This fluid is pale yellow in colour, and if carefully collected in a clean vessel will usually become spontaneously coagulated within a few minutes, due to the presence of red corpuscles in small amount. The cavity of the chest also contains this yellow fluid sometimes, and it may be found in greater or less amount in the peritoneal cavity (cavity of the abdomen). This exudation of serum into the serous membranes is more or less general, and it is also found in the subcutaneous tissues especially following the lines of the larger venous trunks. Under the neck in sheep this exudation forms a swelling during life which is frequently discernible and forms a symptom which is known to farmers. The lungs are pale and the lobules may be slightly separated by the exudation, which occurs along the lines of the interlobular septa. On making section of the lung and gently squeezing it, white froth may be seen to issue from the orifices of the cut air tubes. This froth is not usually found in the large wind-pipe, but traces of it have been found in some cases even in this situation. In the abdomen the yellow fluid is frequently found, and the submucous tissue of the stomach is often rendered doughy or pasty to the feel, due to its presence in the infiltrated tissue.—*Edington.*

Natal Prohibits Fruit infected with Codlin Moth.

Fruit-growers and others are notified that the introduction into Natal of all consignments of apples and pears which shew any indication of being infected with the insect pest known as "Codlin Moth" (*Carpocapsa pomonella*) has been prohibited by the Government of that Colony; and further that any consignments of the fruit in question which, upon inspection, are found to be infected with the insect pest above mentioned, will be destroyed.

Dodder and Lucerne.

In connection with the article appearing in this issue on "Dodder and its Eradication," we may quote a recent contribution by Dr. Schonland, of the Albany Museum, on the subject, who then said :—There are close on a hundred different species known in the warm and temperate parts of the world, many of them spread over all civilised parts with their host plants. To the botanist, they present many points of interest, and when closely examined, their flowers are seen to be of exquisite beauty. One species is even cultivated in the East Indies on account of its pretty flowers, which resemble those of the European Lily of the Valley. However, as several species are most destructive to some important cultivated plants, an incessant war has to be waged against them, and it must be a war to a finish (a by no means easy task), otherwise all expense and all labour is thrown away.

To farmers in South Africa the dodders which attack lucerne are of primary importance. When the species found in South Africa (eight in all) were dealt with in the Flora Capensis in 1904, no species found on lucerne in Europe was mentioned, and thus no specimens could have reached Kew from our parts, but a new species (*C. medicaginis*, Wright) known from no other part of the world was described from specimens found on lucerne at Queenstown by Mr. E. E. Galpin. I have identified with this species dodder found recently on lucerne close to Grahamstown, grown from seed bought from a well known English firm of seedsmen. It is most likely, therefore, that while this seed was free from dodder, the lucerne was subsequently infected in South Africa.

Hitherto it has generally been held that clean seed means clean lucerne. Once the danger of infection by an apparently native species is known, farmers will be on their guard against it, but as long as we do not know whether it is also found on wild plants, and if so, on which of these, the task is rather complicated. It would be, therefore, of great interest and importance to get definite data as regards the distribution and host plants of dodders in South Africa generally, and farmers who observe them either on cultivated or wild plants, would greatly oblige me by sending me specimens of them, together with recognisable parts of the host plants.

FARM AND VELD.

A Remarkable Case.

Veterinary Surgeon Robinson, of Mossel Bay, sends us the following interesting account of a most unusual case. He writes:—In November, 1905, a small cross-bred Kerry Cow belonging to Mr. G. F. Muller, Rietvley, Mossel Bay, was receiving a dose of medicine in a tablespoon; the cow by some accident swallowed the medicine and the spoon together and for a little time was watched with some anxiety, but as she showed no ill effects the matter was soon forgotten. In the early part of this year a swelling was noticed on the lower portion of the cow's ribs on the left side, but little attention was given to it until March, when it broke and the handle of a spoon became visible, it was left for some time and attracted considerable local interest. When my attention was called to it I found about half the length of the spoon projecting through the skin, in the anterior portion of the triangular space formed by the cartilages of the false ribs, and plainly seen from the left side. It was partially retracted at times by the action of the walls of the stomach, but did not appear to inconvenience the cow in any way. There was a very slight discharge of the fluid portion of the stomach contents. On casting the cow and slightly enlarging the opening I found the spoon appeared to be held fast by a growth of membraneous tissue around its mouth piece, but it was ultimately removed without much difficulty and the wound dressed with cotton wool and iodoform. The discharge soon ceased and the wound healed in about fourteen days leaving only a small knob at the seat of the operation, but the point of interest in the case is not the removal of the spoon, but the fact that a foreign body of this character could be forced through the walls of the stomach, and, what is more remarkable, through the tough skin, as it is perfectly smooth with no sharp portion to produce the primary opening.

The method by which a needle or other sharp body may be drawn through the coats of the rumen into the pericardium is easily understood, but in this case the spoon must have been retained in the same position by the muscular walls of the stomach until the continuous friction produced perforation. The spoon is a metal one of the type in common use for kitchen purposes and does not appear to have been affected in any way by its remarkable adventure, its appearance, I am informed by its owner being exactly the same as when it was swallowed by the cow.

The Castration of Ostriches.

Mr. H. J. du Plessis, of Henopskraal, Phillipstown, wrote recently: I have read the lecture delivered by Government Veterinary Surgeon Elley at Oudtshoorn on Saturday, July 21st, 1906, on the "Castration of Ostriches" in the September, 1906, issue of the *Agricultural Journal.* On the 13th instant, after a *post-mortem* on a couple of birds, I performed the operation on one of my ostriches, but had a good deal of trouble in getting the bird under the influence of the anæsthetic, having no apparatus to apply same. On Wednesday evening the bird was very poorly and on the following morning I found it dead. On opening it I found the whole abdomen full of blood. I sewed the peritoneum and muscles together with six stitches of cat-gut. Can I have made the stitches too tight, or is hæmorrhage the cause of death?

Veterinary Surgeon Elley supplied the following reply:—It is not stated whether the blood found upon *post-mortem* was fresh blood or coagulated; as however the operation was performed upon the 13th, and the bird did not die until the 17th or 18th, I consider it very improbable that hæmorrhage was the cause of death. I have now castrated close upon four hundred birds and although many of them have been aged birds with enormous development of the testes, I have not had a case of death from hæmorrhage. The stitches can not be put in too tightly. I think it most probable that the bird in question died from peritonitis, and particularly as the writer states that he made two *post-mortem* examinations on the same day and before operating. I would impress upon all, the necessity of the hands, instruments, etc., being absolutely aseptic when operating within the abdominal cavity.

Lucerne Cultivators.

An esteemed correspondent writes:—Lucerne growing in this country has until quite recently been carried on in a rough and ready way and the returns have been so handsome that little attempt has been made, generally speaking, to get the best out of it. In districts where thousands of acres are under this crop, it may be immaterial whether water can be got on to all the lands under the furrow and there may be no necessity to level down the lumps and fill up the hollows to prevent drowning. The lands are large, the floods are large, the returns are large, and the conservation of moisture in the soil is perhaps unthought of though the saving by frequent cultivation may sometimes amount to 30 per cent. and may prolong the growth some months. The amount of grass in the lands is large too, and it forces itself on the notice of the wealthy owner, for it is steadily supplanting the lucerne and he is looking round for an implement which will eradicate it, but beyond this, opinions appear too indefinite and too various to admit of their being expressed in a demand for an implement capable of performing certain work.

The Cradock Agricultural Society, realizing these difficulties and anxious to bring its machinery section up to modern requirements (by testing under South African working conditions, all machinery, implements and farm appliances for which it offers prizes) undertook a lucerne cultivator trial at its last show, but the short notice of the competition prevented any special attention being given to the subject by manufacturers and inventors, and although one new implement was produced and ten in all tested, it was considered not to have attained its object of pointing out to farmers (1) Implements really suited to the cultivation of lucerne sown broadcast and (2) the conditions under which each was most suited to perform its stated work. The Society therefore decided to offer a £100 prize to be competed for next year, and is sparing no trouble in studying the subject and is doing its utmost to make it a thorough success, and with a view to considering all aspects of this somewhat complicated subject it may be well to remind farmers of some facts which bear on it.

Many lands are insufficiently cleaned before sowing. Repeated ploughings are generally necessary, for seeds with any tendency to oil in them have a great vitality. They can be trodden deep into the lands, and after remaining there years, may be brought to the surface and grow, and it is only by repeated cleanings that the lands can be freed of them for sowing. Then comes the question, Should the sowing be in rows made by drills (at, say, three inches apart), or should it be broadcast? Farming opinion here, judging by the practice, would reply, "Broadcast," and the writer, therefore, refrains from discussing the cultivation of lucerne sown in close drills, further than to state his opinion that the checking of grass and weeds and the preservation of moisture, and the airing of the soil is a comparatively easy matter with this system, and he knows no good reason for rejecting it, and thinks leading farmers should give it a fair trial under present-day conditions. Thus the subject is reduced to the cultivation, etc., of lucerne sown broad cast.

The first thing to realise is that the requirements of the lucerne farmer with old lands very much over-grown with grass, are not altogether similar to those of the man who is sowing to-day and who, by adopting differing methods, may be more fortunate than the pioneers of the industry in keeping grass in check. The former has grass in abundance, the latter has not; and by giving thought to the subject, he may be able to so hold it down that it will never be a serious question with him. Let us take first the case of the old lands with much grass. Among existing implements Americans have singled out the single disc harrow (20 inches in diameter) as being best for use *once a year* for cutting out the grass and loosening the soil, which is further pulverised by cross harrowing; and the trial at Fish River confirmed American opinion of a year or two ago, but it would be ridiculous to state that we have an implement which is all that can be desired for the purpose. Such is not the case. In selecting an implement for the cultivation, etc., of broadcast lucerne, it is truly "a choice of evils!" but inventors may always "go one better" when they thoroughly understand what is required, and the conditions under which the work must be performed, and old hands may reasonably hope for something better for the purpose at the next trials, provided sufficient time and inducement is offered.

Let us now consider the needs of the new sown lands with clean seed beds. Grass and weeds *will* come, and they must be rooted out at the earliest possible opportunity, and before they have become deep-rooted. This necessitates a weeder which can be used repeatedly without much injury to lucerne which is six to twelve months and older, and the same implement must be able to produce (after watering) a fine tilth two or three inches deep, which will reduce capillary attraction from below, and so save moisture. The writer is of the opinion that an implement can be designed somewhat to the following outlines, viz.: Running on wheels which will admit of its travelling on them safely from land to land. Having a roller or drum revolving at a sharp speed by gearing from the main (travelling) wheels, and fitted with long spring arms or teeth, the roller being suspended and capable of being lowered or raised by the usual lever and quadrant, so that the teeth can be raised out of harm's way for travelling, and can be lowered for either very shallow or deeper cultivation. The principle would be best made clear to foundry and machine shopmen, by stating that it would be the "power wood moulding plane," adapted to cultivation, where the travelling pace of the team would represent the "feed" of the moulding plane, and where the drum and teeth would represent the blade holder and the revolving blade. By adjusting the proportion of the speeds of the travelling wheels and the drum, unquestionably any fineness of tilth can be produced in either dry or irrigated lands, and with a little practical experience, the writer believes that such a machine could be arranged to keep new lands free from weeds, and to considerably reduce the grass in old lands even if it does not altogether do away with it; and this without materially damaging well-grown broad cast lucerne over twelve months of age.

Winter Irrigation of Fruit Trees.

This is one of the many questions regarding the treatment of fruit-trees that does not admit of a simple yes or no. No amount of counsel or advice can do away with the necessity for a skilled judgment founded upon the daily aspect and condition of the trees themselves, as well as the climatic influences which obtain. In the dry, cold winter time, in the Eastern Province, the trees have a natural physiological period of rest, which nature demands for all deciduous sorts of trees. They are alive truly, but they are making no growth; there is therefore no waste save the trifling amount incidental to their respiration. They require only so much moisture from the ground as may serve to keep their tissues in a normal healthy state, and prevent mischief or death by their young parts transpiring more than they receive. What then can be the use of any greater water supply than fulfils this very moderate requirement? Injudicious irrigation may easily result in waking up a tree to unseasonable growth, if it happens that there supervenes an unlucky spell of warm weather. You then have the buds swelling and the blossoms coming out just in time to be caught by one of those severe late snaps of frost which we owe to the intense radiation of our cloudless nights inland, in late winter and early spring. The unintelligent use of irrigation water in some parts of this country, next to the imperfect way the land is in the first instance prepared for the trees, arises out of the amateur notion that water is the grand panacea for all the evils, and that everything will come right if you only pour plenty of water on. The trees will let you know fast enough when they require water if they are only carefully watched, and you interpret the signs whereby they explain their wants in dumb show. The very fact that finer fruits of most kinds are produced in the Eastern Districts than in the West should, in a measure, prove that the dry, cold winters, with the absence of moisture, under which conditions the trees enjoy a thorough seasonal rest, is what does it more than anything else.—E.P.

Sawdust as Manure.

Mr. Frank A. W. Mangold, of Storms River, Humansdorp, writes saying he has about 200 scotch cart-loads of sawdust on his property the accumulation of some two years' work from a sawmill. He wants to know if this could be used for manurial purposes, and in what manner he could turn it to good account.

Sawdust, in its ordinary conditions, is really of no value as a fertiliser on account of the mass of cellulose. It does have a slight mechanical influence in loosening very heavy clays, but can scarcely be regarded as an actual plant food in this state. It only decomposes very gradually and in so doing does not materially improve the soil. Very probably this sawdust is utilised in the furnaces at the sawmill. The resulting ash is of considerable manurial value containing probably between 4 per cent. to 7 per cent. of actual potash, from 1 per cent. to 2 per cent. phosphoric acid and upwards of 30 per cent. of lime. It is therefore suitable for application to any crops especially in conjunction with basic slag (Thomas' Phosphate) which would supply the phosphoric acid in which wood ashes are relatively deficient. Wood ashes may with advantage be used for cereals and the like at the rate of 400 lbs. or more per acre.—E.A.N.

Drainage and Orchards

Mr. A. G. Du Toit, writing from Keimoes asks:—Can you or any of your readers give me some information as regards the dying of my peach trees. The trees, after having been planted, grow well till they are about one or two years old and then they begin to die, from the top; the lower part keeps on growing till about two or three months later, then all the leaves begin to shrink and to drop off, till the tree is quite dead. The ground, where the trees are planted is a little brak, could this be the reason? Kindly advise me as to what kind of trees I should try to grow.

The existence of "brak" points to want of sub-drainage, and this invariably produces yellowing of the leaves in the same way as "hard pan" does. If there is no under drainage beyond what soaks away through the land, and there has been a heavy rainfull or too much irrigation,—the fine rootlets, upon which the tree's well-being depends, will have been drowned out and killed. The first symptom of this is yellowing of the leaves, followed by their falling, and after that, the dying back of the year's growth, and gradually the slow decaying of the whole tree. The only remedy to be permanent consists of establishing thorough under-drainage, so that no water-logging can occur. French drains cut deep down the slope of the orchard to a sufficiently good outlet, and filled in with rubble stones to a depth of eighteen inches from the bottom and brushwood placed on top of the stones, sufficient to keep the earth from washing into the crevices between the stones after the drain is filled in, will keep off the brak and renew the land so far as to admit of growing peaches as well as other sorts of fruits.—E.P.

The Vegetable Garden.

June.—On high and dry situations crops of peas may be put in. Celery should be earthed up for blanching towards the latter part of this month. Tomatoes, cucumbers and melons may be sown under glass in small baskets or pots in warm sheltered spots for putting out later on. Canadian Wonder and French beans can be sown on light soils, and turnip, radish, beet and lettuce may be sown in high localities not infested by slugs. A succession of cabbage, cauliflower and knol-kohl crops may be transplanted. Vegetables make but little growth during this and the two next months; yet they must be put in so as to come away when spring weather arises, in order to get the crops for the early markets.

Note.—To those wishing to go to the trouble of raising early tomatoes, cucumber, marrow and melon plants, the writer presents the following tips:—Obtain a number of old small strawberry baskets that may have found their way into restaurants, tea-rooms and such places during the strawberry season. Fill them with rich and well prepared soil, sow the seeds of the vegetables mentioned in these baskets, say three seeds in each, so as to prevent failures, and thin out later on. Place these baskets in a warm sheltered eastern aspect; under glass if this can be done, or even under a verandah facing east; shift the baskets occassionally to check the roots from growing out beyond the limits of the soil. When the season for planting out comes round, the plants will be strong and well grown and near the flowering stage. The baskets, with contents, may then be put into beds ready to receive them, and a specially early crop will be secured.

A TREATISE ON
CITRUS CULTURE FROM SEED TO FRUIT,

Shewing the Influence of the Stock.

By W. E. Masters

(Formerly of Grahamstown, C.C.)

(Concluded from Page 630,)

CHAPTER XIII.

The Science and Practice of Grafting.

A few pages back, budding or grafting on to dissimilar stocks was compared with the human analogy of unions between the black and white races, which analogy is only correct when both positive and negative generative forces are equipollent; but, as has been shown under "Crossing," page 613, these forces may be increased or diminished at the wisdom of the operator as they allow the use of inferior stocks, and yet retain the maximum of excellence accordingly as the factors making for or against stock-influence are fully understood and wisely followed.

To amplify this point. Budding and grafting in a general way, that is, merely as a mechanical means of uniting portions of one tree to the system of another, etc., both serve the same purpose, but the two operations, when viewed specifically and horticulturally in the light of the knowledge originated by the discovery of stock-influence, are separate and distinct.

Depreciative or degenerative stock influence can only be successfully controlled by the constant use of large scions, as used in grafting, whereas persistent *budding,* that is, using buds as the means of propagation, necessarily entails an increasing preponderance of stock influence with consequent loss of merit in the fruit, unless such stock influence shall be controlled or is of a grade but little inferior to the order of merit possessed by the scion grafted above it.

For instance, let us take four identical *lemon* stocks, each as thick as one's thumb, to illustrate a dissimilar stock force; and for scions, wood from a high grade seedling orange tree, as showing the action of budding *versus* grafting in the ultimate fruit and growth of the scions.

(1) On the first stock we *bud* the smallest living orange eye; (2) on the second stock we insert a small three-eyed graft; (3) on the third stock we cleft-graft the largest possible graft the stock can move.

Presuming all to take, the result will show that the flavour of the fruit in the case of No. 1 has been distinctly influenced by the lemon stock. In No. 2, it will be barely distinguishable, certainly not without long acquaintance with it, and in No. 3 there will be found no trace of stock influence so far as concerns the fruit.

The growth of wood at five years (excluding all factors of soil, or stock specialisation or scion influence) in the case of No. 1 will be found to have exceeded the growth of No. 2 in the ratio of 4 to 3; the latter having grown three feet to every two feet made by No. 3.

This, as reckoned by the No. 4 control lemon stock, which was not cut down.

In these instances the size of the fruit will, as nearly as possible, be found to correspond with the growth, namely, the largest or freest growth carrying the *best looking* fruit, as has been previously explained in the chapter dealing with the lemon.

If a high grade pedigree orange tree has been selected, especially with the view of using it as a propagating or distributing tree, the first essential would be to ascertain its true stock speciality (provided it was unknown) with the object of continuing the excellence for which it was selected, in conjunction with similar freedom of growth. The second consideration would be to secure and impart to each scion removed from such tree, a continuance on the *new* stock of the merit possessed by the propagating tree, and so far as my knowledge extends, this desideratum has never been accomplished by anyone, because orange culture—or for that matter fruit culture generally—has never been definitely sub-divided into respective spheres of influence, apart from blossom or seed. Stock influence seems to have evaded the grasp of science by failing to find a foundation; in fact, some deny the existence of stock influence altogether because they cannot find it. The "Jaffa," for instance, seldom or ever maintains its growth or excellence in the new country to which it happens to be introduced, the reason being ascribed to that peculiar term "acclimatisation," but the Jaffa would as speedily degenerate in Jaffa itself unless there was a definite and recognised procedure followed all the time, and although their practices may be described as crude, nevertheless, the "Masters System" exists there, as certainly as it does in every other country where successful fruit culture is carried on and merit maintained.

As a *system* at all, it forms neither part nor portion of any tabulated or recorded horticultural knowledge extant, although it is the bed-rock of success, as well as the maintainer of excellence.

How such merit may be retained in the fruit, how quality may mean quantity as well, and how growth can be secured by "harmony," has been previously dealt with.

The practical or mechanical side of budding and grafting now needs explanation.

BUDDING is much easier performed than described, nevertheless to strike foundation principles as the learner should understand them, I will attempt a departure from the old stereotyped description in order to press home the main points. Budding does not depend on a certain shaped knife with a razor blade, but in nimble fingers, quickness in handling, and in knowing certain things beforehand. A "fumbler" will never excel as a budder.

On a hot or dry day a bud will often fail if two full seconds shall have elapsed between cutting the bud from the twig and having it placed in position in the slit previously made in the stock. A bud that falls off the knife on the ground on a dry, windy day will fail, not so much by the dirt or dust which may have adhered to it, as by the length of time it has taken to pick the bud up from the ground prior to insertion.

A bud newly cut from a scion or twig, is a vivid, wet, shining green, which is its external visible token of union with the stock. Half a second after it has been cut, some of the tissue and life sap begins to dry up. One second after it has been cut there is enough dead or dried tissue intervening between the living eye in the bud and its future site on the stock to seriously jeopardise its chance of union unless sufficient moisture happens to be present on the cambium layer of the stock to compensate for and to return to active life that which has evaporated or been neutralised on the face of the bud.

In two seconds after it has been cut, the vivid green of the bud will have disappeared, and a dry, whitish hue be evident; the wet sheen of its life-sap having gone.

Many "buddists" meet this difficulty (and in order to increase their piece-work number) by cutting the slit and opening it roughly, thereafter cutting small eyes or buds and allowing it to rest on the knife, whilst they pick it off with the finger and thumb, and insert in the slit made in the bark of the stock. They often wonder how it is they get better results on a hot, dry day than they do on a cloudy or cool day, or why they usually have so large a percentage of failures.

Some workers cut buds "up," some few cut them "down." Some insert buds upwards, some push them downwards. Some think, others plod, but budding is absolutely brains and skill combined. Budding may be successfully accomplished with a broken bottle, or a Chinese broadsword, but the best and quickest implement is a sharp knife *with knowledge behind it.*

The longer a knife will retain its cutting edge the greater the risk of failure, unless it is dried or wiped after every cut. On a hot, dry day, the knife dries of itself, and needs no wiping.

Vinegar or fruit acids on a bright steel dinner knife is made visible by its tarnishing the steel; the sap from scion or stock is the same as vinegar in its action on steel; therefore, unless this corrosion is wiped off *before* making a new cut, it becomes an active poison which is transferred from the knife to the bud, from whence the latter dies soon afterwards. If such a dead bud is pulled out, a yellow stain is visible on the *wood* of the stock, and occasionally on a thin membrane of the cambium layer. If the poison is excessive, it often causes the wood of the stock to decay at the exact spot where the bud was; at other times it will retard all growth *above* the spot, and sometimes kill all living wood above the steel poison. This last feature is seldom noticed on the common, low-grade, grafting stocks. Failures in budding mostly originate from two causes, namely, delay and slack tying. "Delay" has been explained and may be proved by observing the growth of the cambium layer which will be found to have re-grown to normal thickness without uniting the bud.

Slack tying will present the same feature with this difference, that the top or bottom fragment of bud will probably be found adhering or united, whilst the more central portion is dead. Slack tying, together with the additional disadvantage of a bad-shaped stock, or ill-fitting bud, accounts for many failures, but buds will die from antithesis, from foreign matter, as well as from rain, air, or water getting behind them, etc., etc.

Successful budding is the outcome of plenty of practice and the exercise of intelligent analysis.

When to bud.—Limiting this question to the citrus family, the answer is simple, namely, when the ground is full of rain-moisture and the stock is just sprouting. It will be a poor budder who gets many failures under such favourable conditions. Citrus in this country may be budded all the year round, or whenever the stock makes a new growth. Any bark that will not lift, that is to say, bark that will not admit of being easily loosened from the tree or stock, cannot always be budded, perhaps, at the exact spot chosen, but if tried on the other side, or a little lower or higher, can often be accomplished. On any stock not cut down the bark will be found to more or less lift at any period except in extremely dry weather, but the mere fact of the bark being detachable is insufficient warrant to commence budding unless the branch system has commenced sprouting, and moisture is present in the ground to back it up.

Grafting is much the same, but stocks are more usually cut down for a variety of reasons. Very hot weather often burns or kills young graft growth; therefore, grafting is preferably done earlier in the year, or when the weather is cooler, and budding during the hot summer months, as they are sheltered by the foliage of the stock, which is not cut down.

To shade the young growth made by grafts or buds many devices are used, the best being a hollow disc (similar to the sides of a large 1-lb. cocoa tin, with the bottom cut out, and a rim jennied round to hold the string) with a white rag tied over the top. The growing graft pushes this rag up, which is observed by the attendant, who pulls up the tin, cuts a slit in the rag, pushes the disc back in the ground to keep it from blowing over, and carefully introduces the growing top of the graft through the slit into the outside world. It grows thus until it has sun-hardened sufficiently to dispense with the tin altogether. I have not used these tins for several years, finding they made softer wood, and necessitated staking, in addition to which "borers" attacked such soft wood more readily than they did the free-grown, naturally sun-hardened wood. There is, however, a more important reason, inasmuch as the use of such "tins" compel one to adopt a low-down bud or graft, as they are only some nine or ten inches high.

A *resistant stock* is no safeguard against root-rot unless the scion is grafted or budded not *less* than twelve inches above the ground. It seems, therefore, wise not to limit one's method to these tins, even if affording a more expeditious method of propagation, but to make the greatest feature of resistant stocks to lie *in* their resistancy.

Stocks for grafting should be cut down some days before they are to be used, unless the ground is full of rain-moisture.

If the ground is comparatively dry, and irrigation has been resorted to, it will be noticed, after the first day or two, that a stock has been cut down, that for an inch or more below the cut, the wood is destitute of sap and totally unfit for grafting, although at the time it was cut down it may have been in good condition. It is, therefore, plain that if a graft or bud has been inserted immediately such a stock has been cut down, it remains dormant (from the stock) for several days, according as whether or not the moisture which caused the flow of sap was sufficiently strong to re-establish such flow before the graft or bud would become prejudicially effected. Probably in a few days the shock will be overcome, and in a few more it may be noticed sprouting. When these sprouts are about half an inch long, or even less, the stocks are then in the best possible condition for grafting or wood-budding, notwithstanding the fact that the bark will not lift so easily as it would have when they were first cut down.

It should be understood that the time to cut a stock down is determined by the fact of its commencing to sprout *up in the branches,* because there is no such thing as "months" for citrus working.

How to Bud or Graft.

Definition of terms:—

Top—means that part of the tree, stock or scion furthest from the roots.

Bottom—meaning the opposite, or the portion nearest the roots.

Up—means *upwards*, that is, from the bottom of the tree *as it grows*, irrespective of how it is held in the hand. Cut *up* means to cut from the roots upwards towards the top, or in the direction the sap flows.

Down—from the top to the bottom, etc.

To insert a graft or bud, first examine the spot where you intend to insert it to see if at such a spot or how near to it the bud may be placed. A smooth, straight place, free from thorns or bumps, is best, so that the bud or graft shall fit close to the wood of the stock. In a general way it may be said that the thicker the bark is of any stock or tree, the thicker the rind is, or the poorer the quality of the fruit, but it must be borne in mind also that the nearer the root and the older the growth of the tree the thicker the bark will be found. The thicker the bark the tighter the lashing should be, and obversely the thinner the bark is, the closer or truer the "fit" should be, and the quicker the handling.

In high grade seedling orange trees, when used as stocks, three expert budders are advisable; one to cut the bud and insert it, another to make the incision in the stock and open it at the exact moment with a proper tool, and the other to tie up as they proceed. Waxing can be done afterwards to give periodical relaxation from the monotonous work. A good, single-handed budder averages 300 buds a day with a fair percentage of failures, but three men can do 1,500 between them with practically no failures at all if each is thoroughly proficient at the work, otherwise better work will be done by each man tying his own buds, seeing he knows just what sort of tie each particular shaped bud needs. Three men working together operate as follows: The man who cuts the T slits in the stock for the bud, carried in his right hand, between his thumb and finger (towards the points of his thumb and finger), an ordinary pocket knife, and between that finger and the next (nearer the knuckles) an ivory or bone "opener." With his left hand he bends the tree over into the most favourable position for the budder to insert his bud. Having made the T incision, he begins to open the bark very slightly, and having his eye on the operations of the budder who is now cutting the bud, he is able, as he sees the hand of the budder coming up, to open the bark for the bud which is inserted at the back of the "opener." The opener is withdrawn outwards, the bud is going down into position, and it is ready to tie without damaging the cambium layer, or without any drying-up of the life-sap (or "life-juice") on the face of the bud.

The budder invariably cuts his buds *up*, never downwards, or against the grain.

Grafting requires only one man, as it is usually done on thicker barked wood. The grafter dealing with the stocks previously cut down now takes a snick off the top of the stump (cut down stock) at the place he intends inserting it, to remove the union or healing made by the bark on to the wood. Sometimes it will be found the bark has been broken away from the stock by the act of sawing down or cutting off, or there may be a hard ridge or hollow where the bark and stock have healed over, thus the object of this "snick" is to pare down any inequalities that may interfere with the straight and easy entrance of the graft into the slit. He next makes a cut up, long enough to receive the graft with a bit to spare, opens it with the "opener" to its full extent downwards, allowing the opener to remain in the slit, whilst he cuts or finishes the smooth bevel on the graft which he partly prepared before he cut the slit in the stock. Removing the opener with his left hand, he inserts the graft before the bark has time to close up, when it is ready for tying. A "shoulder" is quite unnecessary, and only wastes valuable time. The whole of the cut or bevel on the graft should be pushed down out of sight, as it is not the *wood* of the graft which grows on to the stock, nor the bark, but simply the thin membrane which divides or rather joins them. The thicker the graft is, the longer the bevel should be made in order to reduce the angle and give to the graft more uprightness, as well as more contact surface.

Some prevalent Errors concerning Grafts.

Some really intelligent men have seriously assured me that any grafted or budded tree can be pulled off at the joint, years afterwards, because the little piece of wood in the bud or graft, has created a decay spot which ever enlarges with the age of the tree!

Without giving a too lengthy explanation, it may be said that this "decay spot" does not originate from the bud or graft at all, both of which *live* and do not decay, but arises from decay of the stump or stock at the place where it was cut off. If this wound had been painted with a daub of thick paint (preferably white lead) at the time the stock was cut off, there would have been no decay, because the sun and weather would have been kept out. *Paint preserves wood,* and an orange tree is as much *wood* as a stable door. If the tiny portion of wood left in the wood bud or graft was free from steel acid or injured tissue, it becomes as truly incorporated with the tree as its own natural uninjured branches. This can be proved by anyone, and to expect otherwise seems most unreasonable. I have seen a large wood bud and also a graft which failed to sprout, entirely embedded with new stock growth to a depth of several inches, yet the bark of both, as well as the joint, was free from the least sign of decay or discolouration, but the mark of the cut-off, as well as the paint, was perfectly evident. This decay of the stump, by being confused with the position of the graft, has passed into fact, but the remedy is obvious.

Wood Buds.—So far as my experience goes, there is more to be said in favour of the general adoption of wood-budding than can possibly be adduced against it. Estimating "buds" generally at 100 points, then "wood buds" monopolise 90 per cent. of the whole, not only as being surer, stronger, and quicker, but as also possessing better generative power and greater scope for choice. Stock factors, moreover, are able to exert a slightly less influence with wood buds than with smaller bark buds, seemingly possessing some powers of diffusion or conversion over dissimilar stock juices.

How to Cut Wood Buds.—Every school boy knows there is a grain to wood, and that he can make a smoother walking stick by paring it *up,* or cutting with the grain, than cutting downwards against the grain! Yet the fact remains when it becomes a question of cutting buds, this simple knowledge is lost sight of, and they are cut downwards to their evident detriment. In budding, it must be patent to everyone who gives the matter a passing thought that the first essential ought to consist in cutting a bud so true and flat that it could seat itself so firmly as to practically unite by sticking. Cutting down tears tissue and injures the face; in reality it lacerates by such a method, whereas cutting *up* does such little injury that it heals (to use a medical phrase) at first intention. I think anyone who has cut buds *up* will never revert to cutting down as an improvement.

Forcing Growth, or "forcing buds."—As has been explained elsewhere, a tree that has been cut down, makes a supreme effort to recover or restore that which has been lost. If a large tree has been cut down, the whole vital energy of the tree becomes concentrated upon producing one or more new sprouts.

Such wood contains a greater proportion of growth-energy than does an equal quantity of wood from a similar tree not embodying such a condition of supreme concentration or effort.

When "wood" is grown for use as "bud" or "graft wood," such forced growth resulting from the above, carries in addition to possessing the faculty of yielding abnormal growth result in the scion, an abundance of stock influence which is certain to exercise a detrimental effect upon the future (scion) fruit, seeing *stock* fruit is necessarily inferior to scion fruit.

The faculty of transmitting such forcing growth again to the scion is continuous, as long as the forces pushing such growth on are in advance of that produced in the normal branch system; that is to say, proportionately, until the root forces and branch system have equalised with each other.

To make this plainer: I cut down a five-year-old lemon stock, and insert a bud taken from a high grade orange, already growing freely on a lemon stock.

If the whole forces of this stock are compelled by the fruit-grower to become concentrated in this bud's growth, it will result in the production of an exceptionally strong shoot, the ultimate fruit of which will be distinctly acidulated by the abnormal stock forces moulding or overcoming a portion of the orange characteristic. If I, in ignorance, or for experiment, *take a bud* from such first forced growth at ripening or resting time, and therewith bud on to another ordinary two-year-old lemon stock, I not only obtain phenomenal growth from using such forced bud, but a wait of some five years without any prospects of fruit.

When the fruit ultimately forms, it is small, scanty and frequently as acid as the lemon itself, besides being woody, fibrous and almost juiceless.

This, to my mind, indicates that such forced wood growth was formed whilst the effort of the stock was concentrated upon the production of *wood*, having, as it were, at that critical period of its life, no "mind" or intention to reproduce anything but *wood* growth.

This peculiar conjecture is substantiated by similar phases drawn from animal life, and goes to prove that one law pervades all nature applicable to plant life as fully as to animal life.

It is, therefore, apparent that when one grows strong and vigorous scions for use as "bud wood," such abnormal wood growth is unlikely to yield *fruit*, and certainly carries a disproportionate and undesirable quantity of stock influence.

This should be avoided by allowing such concentrated effort to diffuse itself over several growths, as stated under "Training."

Wood for budding should be selected in the case of large trees, from the last growth made and fully ripened, as well as from the vertical growth as nearly as possible at the end of the highest branches on the tree. The scions should be preferably straight, sturdy and well grown, with all buds being well developed and prominent.

Avoid "forcing-growth" and angular buds similar to water-shoot growth, as they will give an undesirable sprawling growth.

Grafts may be chosen in the same way, and should have three or four eyes on each scion, although ultimately but one eye is allowed to grow to form the future tree.

Grafts break off with the wind much easier than buds; it is, therefore, advisable to cut the graft with the bevel on the opposite side to a low-down bud, so that if the graft should unfortunately break off with the wind, the low-down eye will replace it without having to re-graft it.

Wood for either budding or grafting should be specially grown for the purpose, but stock influence must be carefully avoided.

When a scion has specialised itself to any dissimilar stock, budding therefrom on to a similar stock again should never be practised, but only *grafts,* and the larger the better.

If it is remembered that the bud or graft chosen will either form the branch system of a tree carrying its thousands of fruit with a free growth, or become one of the wretched apologies one sees classed as "grafted trees," it is perfectly evident to everyone that something more than the mere knowledge of how to perform a mechanical operation is included in "budding" or "grafting."

In the past pages I have endeavoured to explain the whole forces at work as also how to control and direct them wisely. Future success will depend in how far my suggestions have been grasped, and the ability of the reader to connect the one link with the other, prove them in actual practice and strike the medium that makes for success.

Postcript.—The reason bud-growth contracts a greater proportion of stock-influence than graft growth seems to lie (so far as I can grasp the matter) in the probability that the cellular structure of the bud becomes distorted or strained in some way by an abnormal flow of dissimilar stock juices, which creates a stage more nearly conformable to the ready adaptation into tissue of such juices.

If this theory is studied without bias, the only unnatural part to my mind seems to be why scientists should treat *dis*-similar stocks as being likely to produce the same results as that obtained by similar stocks or seedling trees.

If oranges and lemons appear as separate fruits, and the fruits of both are fed by stock-juices, I totally fail to see why it should be deemed unreasonable for an abnormal flow of lemon sap through and into an orange bud to sensibly disturb a structure only suited by Nature to the flow of its own nature-supplied root juices.

Moreover, seeing Nature is not dependent upon the knowledge of man for the due fulfilment of her laws, and as grafting *is* the sole handiwork of man, it seems passing strange that those who claim to interpret Nature's work should discredit certain facts for the shallow credit of retaining personal notoriety.

APPENDIX.

ROOT-ROT IN ORANGE TREES.

Prevention and Cure.

In the *Agricultural Journal* of March, 1904, page 328, the matter forming the subject of the above heading was clearly explained.

The facts therein set forth comprised the truth, and nothing but the truth, nevertheless, as one who believes that no experience is of service except one shall gain such experience by his own personal efforts and endeavours, so once more, in the interests of those I wish to benefit, I say that Root-rot is as easily cured as prevented.

To my mind it seems positively wicked to calmly allow the grand old orange groves to perish, seeing there is neither necessity nor reason why they should, if one will only believe in the efficacy of the remedy.

There is no finer sight in the world than a mature citrus grove, and nothing that takes a longer time to produce. I do not believe there is one man who would deliberately and wilfully murder his grove—nevertheless, murder it becomes from inability to rightly apply knowledge.

As several old groves that have escaped the ravages of root-rot in the past are now rapidly succumbing to it; moreover, as it seems to be the general opinion of the owners that root-rot is like a relentless fate that at last has singled them out for devastation, so I feel impelled to write again, and say if he who still believes root-rot is doom to citrus trees, will study the following lines, he will be a happier, and I hope a wiser man from perusing them.

To bring theory into actual practice, the intellect must be appealed to, and for this reason I will briefly show why some trees are able to resist root-rot, while others seemingly more resistant, fail.

It is said by many that the common lemon is more resistant than the common seedling orange, and that the pamplemous and Seville are perfectly resistant to this disease.

On the hypothesis that where there is smoke there is fire, this statement may be said to be correct in practice, nevertheless, it is only a partial truth, as any citrus tree will contract the disease, but some easier than others.

Taking the pamplemous as offering in my opinion the highest resistancy to root-rot, we find its root system adapted by nature for close compact loams, with a corresponding breathing system in leaf and branch, showing that the natural habitat and the best results of the pamplemous can only be obtained in a situation having ample and continuous moisture in perpetuity.

Its furcating tap-root system has but few surface feeders, the latter are thick and short, indicating its natural untrained root disposition to be a heavy rich loam with all its feeding close by. Its breathing system and its love of continuous moisture is proved by the contour of the tree as well as in the gross texture of its leaves and the character of their translucent pittings.

The *Seville,* on the other hand, is nearer the common seedling orange. Its root system is built for more open ground, being of a more rambling or "pushing" disposition, and will flourish on less moisture than the pamplemous.

Its roots extend outwards, cover a greater feeding area, are finer at the rootlets, and contain many more laterals, all indicative of more open ground, whilst its leaf system in many instances is but little coarser than the common seedling orange. Its greater resistancy to root-rot lies in the simple fact that it retains much of its natural hardiness, not having been weakened and softened by long years of selection with *fruit* as the primary consideration.

The *seedling orange* is essentially a tree the outcome of selection and culture. Its existing mixed root formation has been imparted to it by long training of climate, soil, and selection for *fruit* until its root character has become definitely fixed in the seed itself.

Whilst it is very similar to its possible originator (the Seville) in many features, it has gained in perfection, but lost in stamina more particularly in its root system. It is invariably selected for its fruiting capacities, with branches to carry them to perfection; thus we find dense foliage, whilst the *grower* demands low-down branches for *shade*.

The common lemon, so far as concerns its mixed root system, is far more liable to contract root-rot than any of the three trees before mentioned, but it has a great compensating feature, which, under natural conditions, often places it on a par with the Seville, and certainly ahead of the seedling orange as a resistant *tree*, but I say nothing as concerns a resistant *stock*.

This statement, therefore, opens up the whole question of *What is the cause of root-rot?* because if the roots of the common lemon are more susceptible to root-rot than the roots of the seedling orange, it stands to reason that if the latter contracts the disease and the lemon escapes, there must be some very simple explanation forthcoming, not only as determining the immunity of the lesser resistant tree, but for the actual cause of the disease itself.

Now I take it that all orange-growers are acquainted with root-rot, and for purposes of proving my point, I conclude also that every advanced grower to-day knows both prevention and cure. *Prevention* being the avoidance of deep planting, and water-logging the ground, as well as to keep the water away from the collar of the tree. *Cure* being to open up both collar and roots to the sun and air.

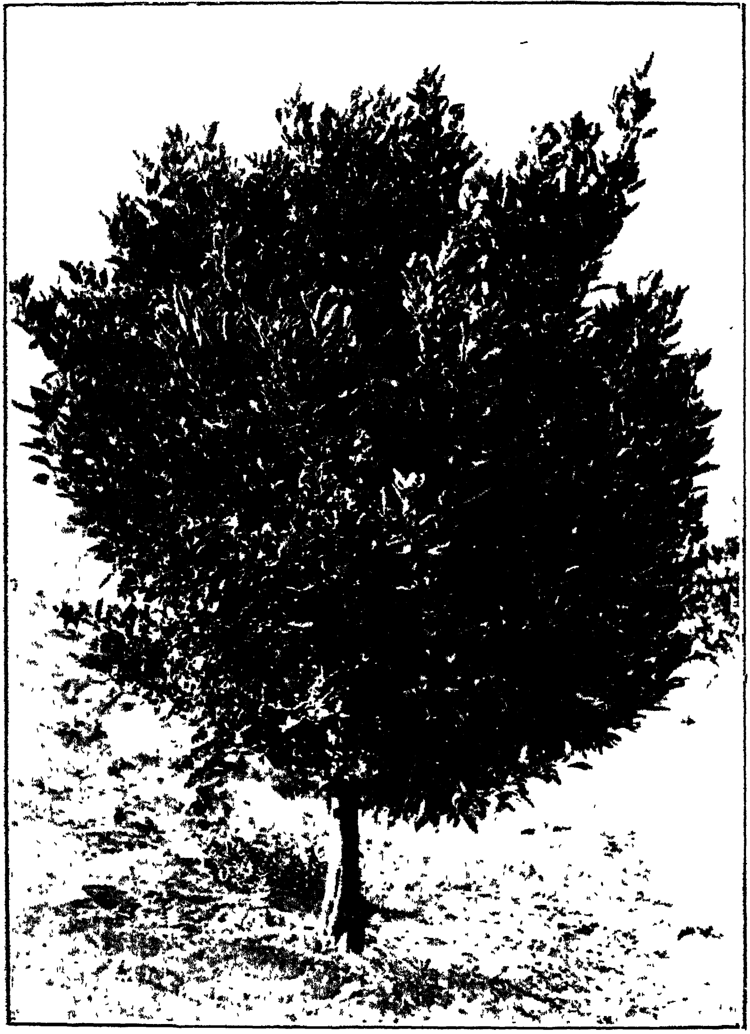
If, then, the cure consists of, practically, sun and air,—or to be more precise, *sun only*, because I think most growers will concede that any orange grove having *sun* must necessarily have *air*—then it follows that the *cause* of the disease must originate by its antipode, namely, the *absence* of sun, or, in other words, *shade* and *moisture*.

It is well known throughout the world that the greatest remedy for mycological, or rotting diseases, is direct sun-light; inversely, therefore, the originating cause must necessarily lie in the absence of sun.

The resistancy of the common lemon to root-rot is thus found to lie in the simple fact that its more open habit allows the sun's rays to percolate through its foliage on to its collar and trunk, which the denser foliage of the seedling does not admit of.

8.—Third Union Grafting —Four year old Orange graft on Lemon Stock ten feet high. Great freedom of growth with sour fruit.

10 —Cinnamon Orange, second union to Lemon crossed from Seville. Four years old, five feet high. Flavour lost from its former union with Seville.



9.—Third Union Grafting. Naartje on Lemon Stock. Four years in position, nine feet high. Great freedom of growth with large sour fruit.

11.—Cinnamon Orange. Second union to Lemon from seedling. Flavour still good and heavy bearer.

13.—Grafting for shape using the topmost twig for grafting.

12 —First union bud to Lemon —Washington Navel Orange showing its early bearing defects ( ) large oranges on a small tree five feet high

14 —Orange on Lemon stock whose first fruit ripening is fine flavoured and sweet, those ripening later sour and latest ripening *sourest* Order of union unknown but previously growing well on Lemon stock About 11 feet high

There is another additional factor, but as it is more of scientific interest than of practical utility I think may be omitted.

Long acquaintance with root-rot proves that the seedling orange succumbs more readily than the lemon, which is because the greed of man too often studies Nature only to obtain her financial benefit, the lemon, on the other hand, not being such a financial success as the orange is not taken such *care* of! The lemon, therefore, has the reputation of being more resistant to the disease, because man does not kill it by care, financial considerations frequently overlooking the laws of Nature.

To prove my point, and induce belief:—If any grower knows of a tree whose bottom branches had been cut away to a height equalling their spread outwards from the trunk, which was not watered round the stem of the tree—and on the collar of which the sun could shine at morning or afternoon—that perished from root-rot, I am prepared to admit that root-rot is my master, and I know nothing whatever of the cause of the "disease."

On the other hand, if any grower now suffering, whose trees are not actually dead, but which have, on one side or the other of them, one inch of sound bark upwards from the collar, I say, if he will cut away the bottom branches in an intelligent manner to a height equal to their length, using neither chemicals nor antiseptics, but allow the sun only to effect the cure, he will not only cure the root-rot, but will have the satisfaction of proving the originating causes, namely, shade and moisture.

When the wounds have dried up, daub thick white lead paint over the exposed *wood*, to keep the *wood* from decay.

BILIARY FEVER IN DOGS.

MALIGNANT JAUNDICE, OR CANINE PIROPLASMOSIS.

By the late D. Hutcheon, M.R.C.V.S.,
Director of Agriculture.

(*A Paper read before the Western Province Kennel Club.*)

This is the most prevalent and fatal form of disease which affects the dog in South Africa. It was in 1885, when my headquarters were transferred to Port Elizabeth, that I first met with it. From clinical observation, I looked upon it as an acute and specific form of congestion of the liver, accompanied by derangement of the digestive organs, a high temperature, a more or less jaundiced condition of the tissues, and the discharge of pontac coloured urine. I called it Biliary fever, because I had met with a similar disease of the horse, which I had already given that name. And subsequent investigation has shown that they both belong to the same group of diseases. By the general public this disease of the dog was looked upon as a biliary form of distemper, but from a clinical study of the symptoms and pathological lesions, I had no hesitation in stating that, although in individual cases Biliary fever might be associated with distemper, it was quite distinct from it, both in character and origin.

At the date which I refer to, this disease of the dog appeared to be confined to the East and South West Coast districts of the Colony. But in subsequent years it was met with over a large area of the Cape Colony and the adjoining States and Colonies, principally along the main lines of traffic. An interesting question arises here, is this disease indigenous to South Africa, or was it imported from Europe, where it is now known to exist, or did it come from the North, or North-Eastern States of Africa, whence we have received some other of our tick communicated animal plagues? I will refer to this point again.

During the subsequent years the study of Texas Cattle fever—a disease believed to be closely related to our South African Redwater—was made the subject of special investigation by the technical officers of the Bureau of Animal Industry of the United States. During 1888-89, Dr. Theobald Smith discovered a parasite within the red blood corpuscles, belonging to the Protozoa, which he named the *Pyrosoma bigeminum*—on account of its pear shape, and the fact that it usually occurred in pairs within the blood corpuscle. It was subsequently classed with the family of Piroplasmosis, and named the *Piroplasma bovis.* Dr. Smith found that this parasite destroyed the red blood corpuscles so rapidly that in fatal cases the number present in a given quantity of blood was reduced to one-sixth of what it should be in healthy blood. During the same period Mr. F. L. Kilborne, who had charge of the camp experiments demonstrated in 1890 that the cattle tick—*Boophilis bovis* (a species closely related to our blue tick)—was the active agent in communicating the disease to susceptible cattle, and spreading the infection to clean pastures. It was these discoveries which led me in 1893 to advance the following opinion with reference to the nature of Malignant Jaundice of the dog. I remarked, in reply to a correspondent in the *Agricultural Journal*, "that its pathology has not been clearly worked out, but it appears to be a special fever, in which the blood becomes disorganised, and the blood corpuscles broken up, thus setting free their colouring matter which appears in the urine. The jaundice appears to have the same origin, accompanied by derangement of the secreting function of the liver. There is ordinarily no serious obstruction to the flow of bile from the bile ducts, and the post-mortem appearance of the liver is not often sufficient by itself to account for the deep jaundiced tint of the tissues, and the dark brown colour of the urine, which are the prominent symptoms of the disease. The disease bears a very close resemblance to the redwater of cattle, which is understood to be due to a parasite which grows and multiplies in the blood corpuscles, breaking them up, and setting free their colouring matter which appears in the urine; the accompanying derangement of the liver, and the jaundiced tint of the tissues, are secondary effects, which in many cases are absent."

Subsequent to 1893, having but a limited staff, and more pressing work to attend to, it was not until 1899 that we were able to renew the study of this disease. The Sanitary Department of the Cape Town Council kindly supplied a few stray unclaimed dogs, which were used for the purpose of determining how the disease is communicated. Veterinary Surgeon Spreull was directed to carry out inoculation experiments for that purpose, and he very soon found that the disease was readily communicated to a healthy susceptible dog, by the injection either subcutaneously or intravenously of a small quantity of blood drawn from an affected animal. He found that when the injection was made subcutaneously the temperature began to rise about the sixth day, but when intravenously, the temperature rises on the fourth day, and death takes place about the eleventh and seventh days respectively after infection. Meantime a specimen of the blood was forwarded to Dr. Carrington Purvis, Acting Director of the Bacteriological Institute, Grahamstown, for microscopic examination, and the following is his report:—

"I have to thank you for the blood of a dog, suffering from Malignant Jaundice, sent in a preservative liquid. I have carefully examined the blood, and find that it contains:—

"(1) Bacilli—no doubt extraneous.

"(2) Organisms, usually one to two in number inside many of the red blood corpuscles. (The diagrams represent these organisms as similar to those present in Texas fever of cattle).

"(3) Rounded or ovoid organisms inside what appear to be white corpuscles (but no nucleus could be made out): these corpuscles may be greatly enlarged red corpuscles." He adds: "If these be really white corpuscles, they have evidently swallowed some of the parasites."

With respect to preventive treatment, Dr. Purvis recommended a trial of subcutaneous inoculation with blood from a dog which has recovered from the disease, as is practised for the prevention of the redwater of cattle. I add a note that "we intend to try that method, but it is very important to discover the manner in which the disease is ordinarily contracted by the dog—whether the parasite is conveyed to healthy dogs by ticks or other skin parasites, as the Texas fever of cattle is." Mr. Lounsbury then took up the subject. He says:— "I was studying ticks at the time with relation to a sheep disease, and naturally became interested in the possible connection of the subjects of my studies with this other disease. Thus was prompted the experiments which followed, which were conducted in conjunction with Mr. Wm. Robertson, of the Veterinary Department, and resulted in the discovery that the common dog tick of the country—*Haemaphysalis leachi,* Audouin—is the active agent in transmitting the infective parasite."

Time will not permit me to give the detailed account of these experiments related by Mr. Lounsbury, which were rendered more difficult and prolonged on account of the unusual habits or life history of the dog tick. Mr. Lounsbury says:—"Like all other *Ixodinae,* both the cattle tick and the dog tick pass through three active life stages, *viz.,* the larval, nymphal, and adult. Preparatory to the transformation from one stage to the next, the feeding of the tick is suspended; thus, after an interval of variable duration, the old skin is ruptured, the tick crawls from it, and very soon seeks to renew its attack. The cattle tick normally stays on one animal throughout the several changes. It remains attached to the skin by its rostrum. After it suspends feeding both as a larva and as a nymph, and hence on the completion of the moult which follows, it has only to re-attach itself to the animal by its new mouth part, an act which it performs almost at once. The dog tick, on the other hand, perhaps because it infests an animal more energetic than an ox in locating and destroying skin parasites, has the habit of invariably loosening its hold and seeking shelter in the ground as soon as it ceases feeding before a moult; and in consequence it has the trouble of finding a host three times in its life instead of once as with the cattle tick, and more often than otherwise a different dog is found each time.

But a more troublesome peculiarity than the change of a host at each moulting, was the fact, experimentally proved, that although the infective parasite is passed from the infected mother tick through the egg, to the larval tick hatched from it, yet, although this young tick evidently harbours the infective parasite, through its larval and nymphal stages, it cannot communicate the parasite to a susceptible host until it arrives at its mature or adult stage.

Dr. Nuttall, University Lecturer, Cambridge, in summarising the results of Mr. Lounsbury's experiments, says:—"The tick *Haemophysalis leachi* certainly transmits the disease when infected with the parasite. To be infective the tick must be descended from a mother which has sucked the blood of an animal affected with the disease. After the parent tick has gorged herself with blood, she falls to the ground, and after a variable time, lays a large number of eggs, from which hexapod larval ticks issue in due course. The larval ticks attack a dog when they have an opportunity, fill themselves with blood, and after about two days, drop off. According to the observations of Lounsbury, these infected larval ticks do not transmit the disease. After lying in the ground for a variable length of time, the larval skin is shed, and the eight-legged nymphal tick issues forth. Lounsbury has also been unable to show that the infected nymphal tick is infective. The nymph in turn attaches itself to a dog for a few days, and, having gorged itself with blood, drops to the ground. Here it undergoes its metamorphosis, as did the larva, and after this is accomplished, it casts its nymphal skin, and issues as an adult sexually mature eight-legged tick. It is the adult tick, and only the adult, which transmits the parasites, according to Lounsbury."

On this striking peculiarity of the life cycle of the dog tick, Mr. Lounsbury remarks:—"That the infection passes through the egg stage is a fact not unparalleled, and, therefore, not surprising; but that it is harboured through two feeding stages without being transmitted, is at present wholly unique, and is a fact that considerably strengthens the inference that in this—dog disease—and the redwater of cattle, the ticks are not merely carrying agents, but are secondary hosts for the protozoan parasites." Upon this, Dr. Nuttall remarks:—"The fact that the tick harbours the parasite after having undergone two moultings subsequent to leaving the egg, and that the adult tick is capable of infecting after having starved for five to six months, as I have found, certainly shows that the parasite must undergo some cycle of development, as yet undetermined within the tick's body. It should dispose of the hypothesis advanced by Lignieres in relation to the bovine parasite of 'Tristeza,' or Redwater, in the Argentine, that the manner in which the parasite is conveyed from the mother tick to the larva, is the possibility that the parasite might adhere to the external mouth parts of the mother tick, after sucking infected blood, and be deposited from the mouth parts on the egg surface, during the act of oviposition, when, as others have observed, the mouth parts play about the vulva.''

The changes which take place in the blood have been carefully studied by J. Aldren Wright, M.D., of the Cambridge Pathological Laboratory, who states that a great reduction of the red corpuscles was a constant feature. In one dog the number fell from 5,800,000 per c.m.m. to 1,000,000, and in another from 5,000,000 to 900,000, on the day previous to the animal's death. The red corpuscles were also altered in character; some were smaller than normal, while others were considerably larger, and these latter stained faintly. When the parasites appeared in the blood, nucleated red cells were also to be found, but usually few in number. In one instance enormous numbers were present, almost equalling in number the polynuclear leucocytes. A comparative count gave 48 per cent. nucleated red cells, to 52 per cent. polynuclear leucocytes. As many as eight nucleated red cells could be seen in a single field of a one-twelfth of an inch objective In this case the red corpuscles were altered in size and shape, and many of them were broken up.

The hæmoglobin was always diminished in amount, closely following the diminution in the number of red corpuscles.

Usually the leucocytes were greatly increased from the time the parasites appeared in the blood. In one dog they numbered nearly 52,000 per c.m.m., and in another they increased to 60,000.

The tick which conveys the parasite in South Africa is ''*Haemophysalis leachi*, Audouin.'' It is supposed to be conveyed by the *Ixodes reduvius* in Italy, and in France by the *Dermacentor reticulatus.*

THE GEOGRAPHICAL DISTRIBUTION OF HAEMOPHYSALIS LEACHI.

This species appears to be almost confined to the African Continent. Neuman (1897, pp. 347-350) states that it was found in Egypt by Savigny, Mozambique by Karsch, Eastern Ethiopia by Antinori, West Africa, at Pangolin, by Mocqueryson, in Algeria by Fayet, in Sierra Leone by Trouessart, and Doumargue, in the French Congo, Transvaal, Cape Colony.

THE MANNER IN WHICH THE TICK ATTACHES ITSELF TO ITS HOST.

The tick fastens itself firmly on the host with its legs, directs its rostrum perpendicularly towards the skin, and on the selected spot thrusts in the terminal hooks of its chelifers. In proportion as these penetrate, the dart follows, and the retrograde teeth on the under-surface of this organ ensure the stability of the apparatus in the wound.

PERIOD OF INCUBATION.

As already remarked, Spreull found, after intravenous inoculation, that the temperature began to rise on the fourth day, and death occurred about the seventh. After subcutaneous inoculation, the temperature rose about the sixth day, and death followed about the eleventh day.

Mr. Robertson states that the blood is infective on the third day, and the parasites make their appearance in the blood corpuscles on the fourth day after subcutaneous inoculations with virulent blood.

Nocard and Motas report that infected corpuscles are rarely met with within thirty-six hours, and even after intravenous injection they do not usually appear until the end of forty-eight hours.

The parasite, having penetrated the blood corpuscle, grows in size, and then successively divides (usually) into 2, 4, 8, 16 individuals. Owing to irregularities in divisions, groups of 3, 5, 6, 7, 9, 10, 12, 14, 15, 18, and even 21, may be encountered, but division forms giving multiples of 2 (2-16) are by far the most numerous, and the usual number reached before the corpuscle ruptures, and liberates its contents appears to be 16.

THE CULTIVATION OF THE *Piroplasma canis*, BY KLEINE, IN WHICH THE IRREGULAR FORMS OF THE PARASITE APPEAR AS SHOWN ON THE DIAGRAM.

After various disappointments, during which the composition of the culture fluids were always being further simplified, we now employ solely diluted blood, and proceed as follows:—

A young dog is so infected with Piroplasma that it will come to an end in three or four days. Shortly before death, at a time when the blood contains parasites in the highest number, the dog is bled under chloroform narcosis. The blood should then be defibrinated, and twenty sterile, plugged test tubes taken, each containing 0.5 c.c. of physiological salt solution, and to each of these tubes 0.5 c.c. of such defibrinated blood is added. The diluted blood should be kept at a temperature of about 27 degrees C. In about eighteen hours the clear fluid above the red corpuscles, which have sunk to the bottom, is removed, and the remaining deposit is examined. In this way one finds pictures, such as have been described by R. Koch. Their aspect is that of large and complete club forms. Above from the thick end of the club proceed about half a dozen long fine rays, while the other end finishes in one, two or more prickles (Kleine).

IMMUNITY.

The experiments conducted by Robertson and Lounsbury in this Colony, and by Nocard and Motas in France, clearly show that recovered dogs possess a strong immunity against natural or artificial infection for a limited time. The probabilities are, however, that permanent immunity can only be maintained by continuous infestation by infective ticks, as is known to be the case in redwater. With respect to the latter disease, observation and experience clearly show that if cattle salted to redwater are removed to an uninfective area for a period of twelve months or more, and are then returned to the infected area, a large proportion of these cattle will become re-infected, and contract the disease in a more or less severe form. Judging from the close relationship between the two diseases, it is only reasonable to believe that the same results would follow similar treatment in the dog. An animal which has recovered from either *Piroplasma canis,* or *Piroplasma bovis*, has not, in the proper sense of the term, acquired an immunity to the invasion of the infective parasite, but simply a strong tolerance to the presence of the parasite in the blood. For example, Mr. Wm. Robertson kept a dog which had recovered from this fever from November 4th, 1901. to April 15th, 1902—over five months—and during that time he inoculated eleven healthy dogs, at intervals, with blood drawn from this salted dog, and every one of the inoculated dogs died of the disease. The peculiarity about this animal's blood was that Robertson could not detect any of the causal parasites in the blood, although he searched for them persistently. They must, however, have been present in some form, although unrecognisable by the microscope. A similar phenomenon is witnessed in cattle which have recovered from redwater, if you leave these cattle on actively infected veld during the summer, and use their blood to inoculate healthy susceptible cattle, the inoculation produces a virulent form of the disease, and very often followed by a heavy mortality. If, however, you clear these cattle of ticks and take them to non-infective veld, after a given time, the blood of these cattle becomes less and less virulent, and can be safely used to inoculate susceptible cattle, as it produces a comparatively mild form of the disease, until it ceases to give any fever reaction at all. But when that time arrives, the salted animal itself becomes susceptible of a second severe attack of the disease, which may prove fatal.

Mr. Robertson's experiments with the blood of recovered dogs, however, indicate that the blood does not gradually lose its virulence with time, when inoculated into a susceptible dog it either produces a severe form of the disease while infection lasts, or no fever re-action whatever. This is a point, however, which, perhaps, requires further study.

Nocard and Motas, who conducted some experiments in 1902, with the object of trying to confer an immunity on dogs exposed to infection, state that the serum of recovered dogs possesses bactericidal action. They say that when one quantity of virulent blood is mixed in vitro with three, four or five quantities of serum from a dog which has recovered from the disease, the mixture can be injected with impunity into clean dogs even intravenously. These dogs give no fever re-action, nor can parasites be found in their blood. No immunity is, however, conferred.

They add:—The microbicidal action of the serum is, however, observed to be much more pronounced when the dogs have been highly immunised by repeated injections of virulent blood; that when injected in large doses this fortified serum can considerably retard or even hinder the fatal action of the virus inoculated twenty-four to forty-eight hours after. They further state that the preventive action of a given serum exerts itself in a much smaller dose when the serum is mixed with the virulent blood before the inoculation is performed. I quite agree, but the fever is less, and the immunity correspondingly short.

All that I can say with regard to these statements is that Mr. Robertson, who devoted a considerable amount of time in trying to verify the results obtained by MM. Nocard and Motas, failed to confer an immunity of any duration. I am of opinion, therefore, that Nocard and Motas are much happier in their explanation of what they term:—

The Mechanical Cause of the Immunity.

They state that in the blood of the sick animals, especially of those which are on the road to recovery, an active phagocytosis is produced. It is common to observe large mono-nuclear corpuscles which have absorbed 2, 3, 4, and up to 6 red globules, all of them infected; of these globules some have already lost all their hæmoglobin; others are coloured almost as well as the normal globules; between these two extremes, all the intermediate stages can be seen; the former have their parasites rounded, very small, scarcely coloured, with an ill-defined contour; in others, the parasites likewise small and round, are strongly tinged, and their contour is clearly prominent.

This phagocytosis operates equally in the depth of the organs; it is observed to be very active on the sections of the spleen, even in dogs which have succumbed to the acute form of the disease. Everywhere mono-nuclear corpuscles can be seen stuffed with parasitic globules in process of digestion. Sometimes the phagocyted globules are so numerous that the phagocytes give the illusion of a capillary, which has been severed across.

The infected blood corpuscles are invariably absorbed by the mono-nuclear; we have never seen a single globule phagocyted by a polynuclear; it is, nevertheless, probable that the polynuclei also contribute to the defence by absorbing the free parasites in the plasma.

If, however, these phagocytes were to maintain their activity after the recovery of the animal, one would naturally expect that the whole of the infective parasites would very soon be completely destroyed; but such is not the case. It will be observed that the blood remains infective for many months after the animal has made a complete recovery. Further, as soon as the blood of the recovered dog loses its power to infect a susceptible animal, the recovered animal loses its immunity. What, then, becomes of the antitoxic or microbicidal action of the serum. It does not inhibit the life of the parasite after convalescence, neither does it appear to exercise any influence to prevent the reintroduction of the parasite when the dog is again exposed to tick infection.

As I have already remarked, permanent immunity can only be maintained by continuous tick infection. Here is where the difficulty of devising effective preventive measures comes in. It is comparatively easy to keep a dog clean and free from ticks if you keep him off the veld. But in the case of a sporting dog, the more effectively you clean him, the more liable he becomes to pick up infective ticks and contract the disease, when he is taken out for shooting or hunting.

It is very important to know, however, that young sporting dogs may be reared with comparative safety, if their kennels and runs are kept clean and free from ticks. Providing also, that no infected or recovered dogs are allowed to enter these particular kennels where these young ones are reared. These precautions are recommended, not because this disease is directly infectious, but because even one adult tick getting on to the infected, or recently recovered dog, would breed out as many young ticks as would, in the succeeding few months, be capable of infecting the whole of the susceptible dogs in the kennel. In fact, all infected and recovered dogs should be kept strictly isolated in kennels by themselves, as they are the source and destributing centre of the infective ticks.

SYMPTOMS.

In those cases artificially produced by inoculation the temperature begins to rise about two days, in some cases more, before the visible symptoms become manifest. The first visible symptoms are the animal appears dull and listless and lies down more than usual, later on it does not change its position for hours, it does not care to feed; it may, however, attempt to eat a little when some tempting food is placed before it. Very soon it refuses all food, but manifests a strong craving for water, of which it will drink large quantities if it has free access to it. It is difficult, notwithstanding this thirst, to induce the animal to take a little milk with its water. In some cases vomiting is an early symptom, but in others it is not observed, except when food is injudiciously forced down the patient's throat, when the stomach invariably rejects it. The urine becomes dark red in colour—deepening in tint to a claret or a pontac hue. Hæmoglobinuria and albuminuria are usually present in acute fatal cases, they may, however, be absent in some cases which prove fatal. The visible mucous membranes become pale and icteric., changing to a deep chronic yellow colour; the hairless portions of the skin take on a similar hue. The breath has a fœtid sickening odour, the tongue is furred, and sordes accumulate on the teeth. The pulse is quick and feeble; the breathing becomes laboured and finally shallow. Towards the end the animal totters in its gait; becomes unable to stand; lies helpless, and dies comatose. The body temperature oscillates from 104 deg. to 105 deg. and may rise to 106 deg. or even 107 deg. Fah.; on approaching death it may fall two or more degrees below normal.

Post Mortem Appearances.

The post-mortem lesions in those cases which are produced artificially by inoculation are very similar to those in which the disease is contracted in the usual manner, and are briefly as follows, body emaciated, subcutaneous tissues and fat, and superficial muscles stained yellow. The intra-abdominal fat is of the same colour; ecchymosed spots varying in number and size on the epicardium and endocardium, most intense in the left ventricle. In many cases the pericardium contains a variable quantity of a serous fluid. The lungs are rarely affected, but in some instances a variable amount of a brownish coloured serous fluid is found in the thorax, and in individual cases, a similar fluid has been found in the abdominal cavity. The liver, in the majority of cases is more or less congested and enlarged, friable, and varies in appearance from a mahogany colour to a deep saffron hue. The bile is generally of a very dark green colour, and thicker than natural. The spleen is usually much enlarged, and its pulp much darker and softer than natural. The fundus of the stomach is generally highly congested, and a few small spots like ulcers may be observed on its rugæ, but the pyloric end is usually normal.

There is a catarrhal and bile-stained condition of the mucous membrane of the small intestines; the lumen of the bowel contains a quantity of viscid mucus. "The large intestines are inflamed throughout with copious exudate of a rusty-red colour on the mucous membrane. Kidneys externally bile-stained, and on section paler than normal in the cortex." (Robertson.) The urinary bladder appears healthy, but the urine is generally of a dark colour resembling claret or pontac, with a fœtid odour.

Discussion on Preventive and Curative Remedies.

There can be little doubt that if a safe and effective method of preventive inoculation could be discovered, one that could be applied say every six months in order to maintain the immunity, that would be the most satisfactory method, and I am not without hope that such a means may be discovered.

Meantime some amelioration of the danger might be effected by dressing the sporting dogs in the morning before going out with some lubricating mixture, which would tend to keep the ticks off, and be capable of being washed when the dogs come in at night. Paraffin and soap emulsion was suggested, but one sportsman present pointed out that when a sporting dog is dressed with paraffin it interferes with the delicacy of his scent, and he is useless. I am afraid that any other disinfectant having a strong odour would have a similar effect. I mentioned that many of the farmers made a deep clay puddle, through which they drove their oxen before sending them on a journey; the clay dried on the legs and feet, and, it is said, prevents the ticks from attaching themselves to the skin.

Sulphur and arsenic were mentioned as preventives. I pointed out that a number of experiments had been made by Mr. Lounsbury in order to test the value of sulphur as a preventive of ticks when given internally, and he clearly proved that even when given in large doses continuously for long periods, it completely failed either to prevent the ticks from invading the animal, or to cause them to drop off before they were mature and ready to fall. It is not an effective remedy, even when applied externally, although it is one of the best cures for Scab. With regard to arsenic, in some of its compounds it is one of the most effective external dressings or dipping mixtures for the destruction of ticks, but it would have to be used with caution on the dog, especially on those with long coats. There would be a danger in bathing dogs at short intervals in an arsenical mixture of sufficient strength to kill the ticks. With regard to its continuous internal administration in small doses, it is very probable that it would greatly assist in preventing the development and multiplication of the causal parasite in the blood, and prove beneficial in that way. The great desideratum is an adhesive, emollient, odourless dressing for the dogs before going out to the veld, which could be easily washed off on returning to the kennels.

With respect to curative remedies, their name is legion, and I have nothing original to offer. In our experience, we have found that if the patient is discovered early, a good dose of calomel should be given at once, and followed up by a pill containing one to two grains of calomel, and five to ten grains of quinine, three times daily for some days. The patient should be kept clean and comfortable, and induced to take a little nourishment. It is of the utmost importance to watch the dogs, in order to detect the first symptoms of dullness and loss of appetite. When such symptoms appear, a dose of calomel from two to five grains, depending on the size of the dog, should be given at once. This is a dose which is likely to do good, even if it is only acute indigestion or congestion of the liver from which the dog is suffering. The majority of dogs are in an advanced stage of the disease before they are observed by the owner.

DODDER AND ITS ERADICATION.

By Dr. Eric A. Nobbs, Agricultural Assistant.

With the extension of lucerne cultivation and the increasing demand for seed, more and more is being heard of the danger of dodder and of the havoc caused by this pest in our finest and most valuable lands. Many farmers are still ignorant of the appearance of the plague, but they are not likely long to remain in this blissful state, as information is constantly received of its occurrence in fresh localities. Once seen, it cannot be mistaken.

For those still unfamiliar with its appearance it may best be described as a tangled mass of thin yellow or brown strands, resembling the tassel of ripening mealie cobs, but spread upon the ground twining round the stems of lucerne or other herbs, bearing dense clusters of white or pinkish flowers possessing a sweet but sickly scent.

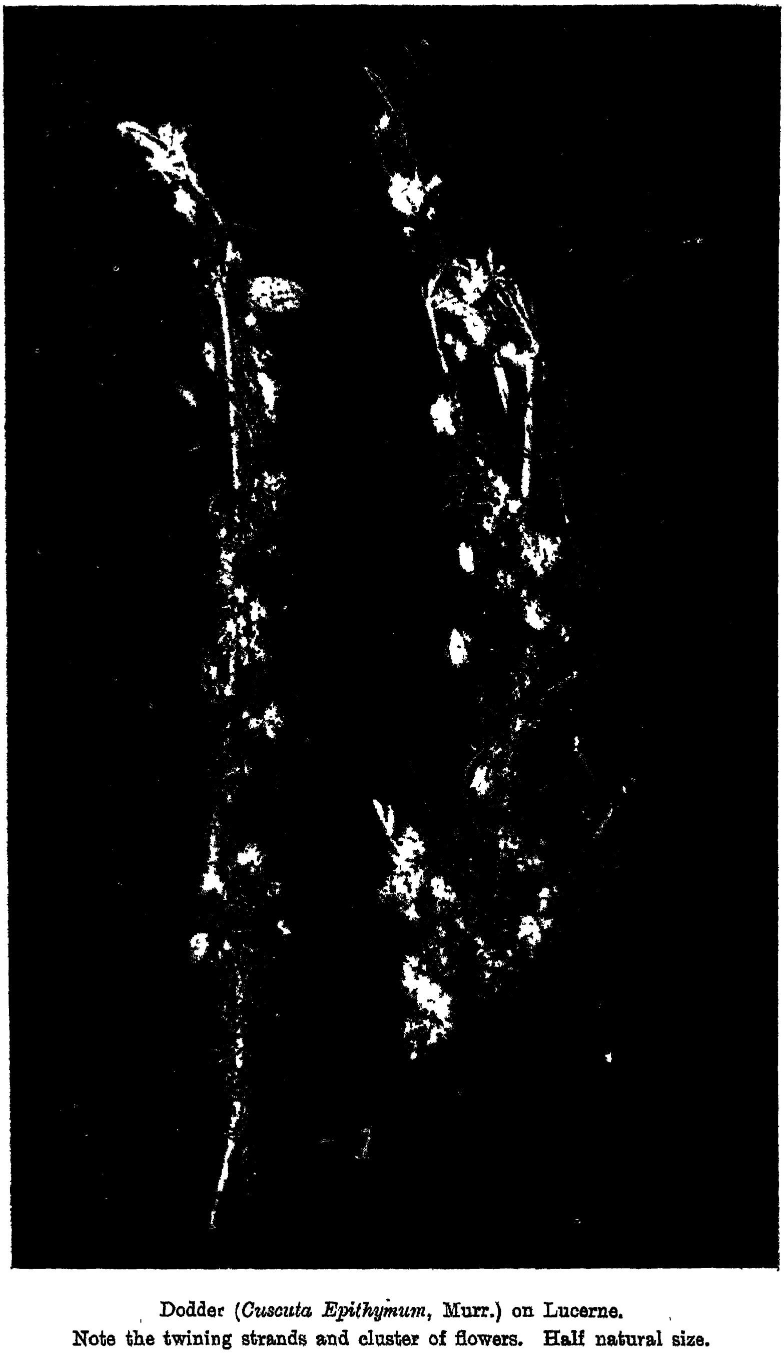
To understand its habits, its simple life history must be known. Supposing the seed to be sown along with lucerne on a new piece of land, it germinates just as do all other seeds, but somewhat more slowly than does the lucerne, a provision whereby the presence of the host is assured when the dodder needs it. Like all other flowering plants, dodder begins by sending down a little root into the ground, but the shoot which springs upward is a single smooth stalk or thread bearing no leaves. The young dodder in its growth gyrates round and round, in the direction opposite to that of the hands of a watch, feeling, as it were, for a lucerne plant to grip. Should none be near the posterior parts of the stalk die off, and the front portion grows out, thus actually creeping over the ground in search of its prey. On finding a suitable host, the dodder laps itself round the stem, and developes a number of processes, technically *haustoria*, which pierce into the stem and, forming an intimate connection with the vascular system of the green plant, proceed to suck from it the sap, taking sustenance and growing at its host's expense. The root of the dodder disappears at an early stage. The dodder grows rapidly, and sends out branches, which in turn clasp other plants, and so spreads like fire through the crop. The rate of growth, encouraged by all the forces which should go to the nourishment of the crop, is extraordinarily rapid, and any fragment broken off is capable of continued growth provided it reaches a suitable plant on which it can live.

There are some hundred or more different kinds of dodder known to botanists, each of which is parasitic upon a single species or upon a restricted number of plants, but not upon anything indiscriminately. The generic name is *Cuscuta,* and in Europe the commonest species are *C. Europaea, C. epilinum* and *C. epithymum.* The last named was first reported in Cape Colony at Graaff-Reinet in 1895. In America twenty-five species are known, of which, on lucerne, *C. arvensis* is common in the eastern States, and *C. epithymum* in the west; hence these are to be specially looked for in seed introduced from those quarters.

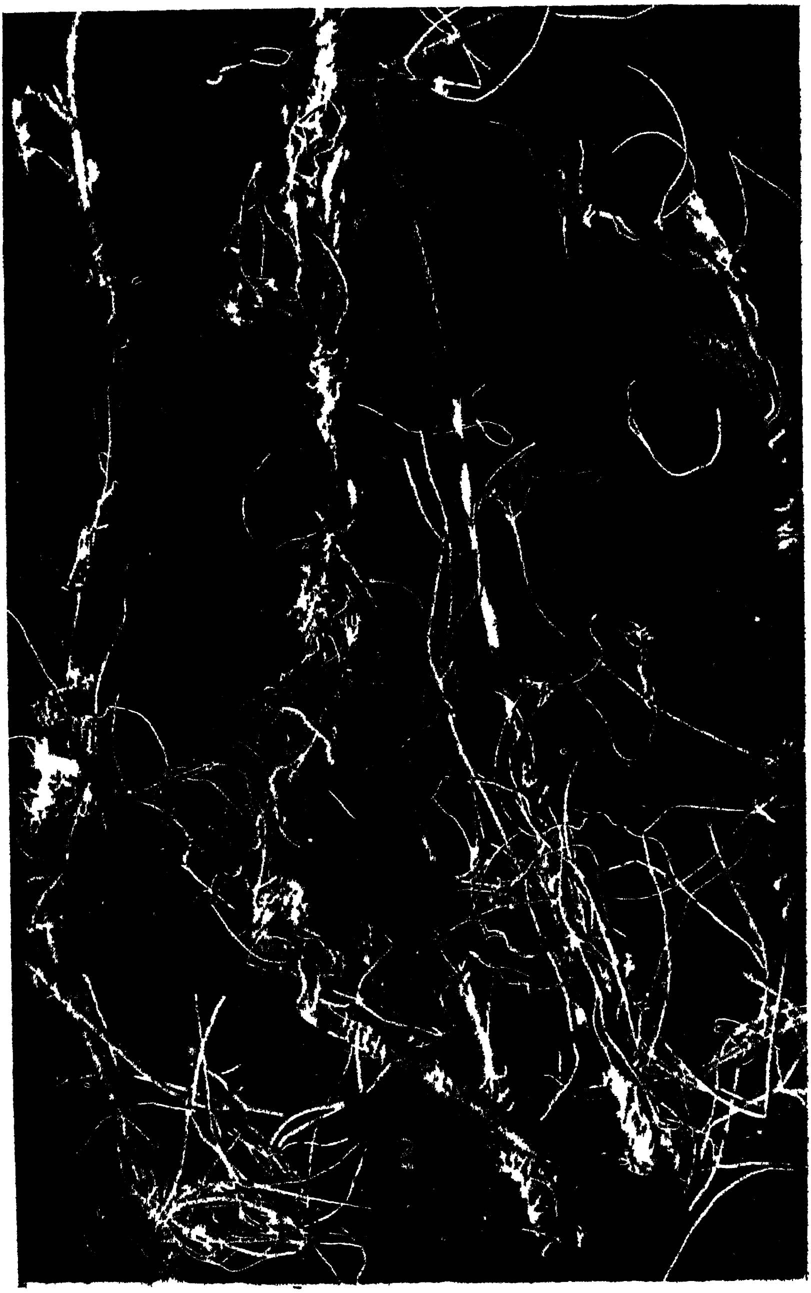
In South Africa there are quite a number of dodders. Those above mentioned have been introduced with seed, and are only too frequently found amongst lucerne. Besides them there are native sorts, such as *C. Africana* and *C. appendiculata,* which occur naturally upon wild bushes in the veld. These often attack lucerne, to which, however, they do not appear to be quite as fatal as are the other varieties. But these two last named possess one characteristic making them more objectionable than the other dodders, the seed is more nearly equal in size to lucerne seed. This renders it impossible to be removed by the recognised process for cleaning lucerne seed, that of passing it over sieves of twenty meshes to the inch, which allows most ordinary dodder to pass through and retains the smallest lucerne seed. It is, therefore, more than ever important for us, especially when buying Colonial seed, to insist upon it, as a reasonable precaution, that the seed was collected from a dodder-free crop and kept free from contamination with dodder in threshing, bagging or elsewhere. No cleaning process is likely to remove these large seeded dodders. Though less harmful than others, these sorts are none the less to be avoided at all costs. These facts render it all the more imperative that dodder whenever found should be destroyed.

The general question of the quality of seed sold, as used throughout the Colony, is receiving much public attention at the present time. It is coming more and more to be felt that, while it is obviously impracticable to define exactly what is seed fit for sowing and what is not, yet there should be some means of ascertaining readily the quality of any particular sample. Following upon the lines already adopted in foreign countries, it is proposed by legislation to provide facilities for the proper examination of seed leaving it to the individual discretion of vendor and buyer whether to make use of the opportunities provided. Certificates will be issued stating the results of analysis of samples upon which the buyer may depend, and whereby the true value of the seed may be accurately assessed.

In the particular case of lucerne a special examination for the presence of dodder is requisite. For this purpose a certain arbitrary standard has been adopted by all the leading seed testing laboratories, whereby it is laid down that if a sample properly drawn from bulk and weighing one kilogram (two and one-fifth pounds) is free from

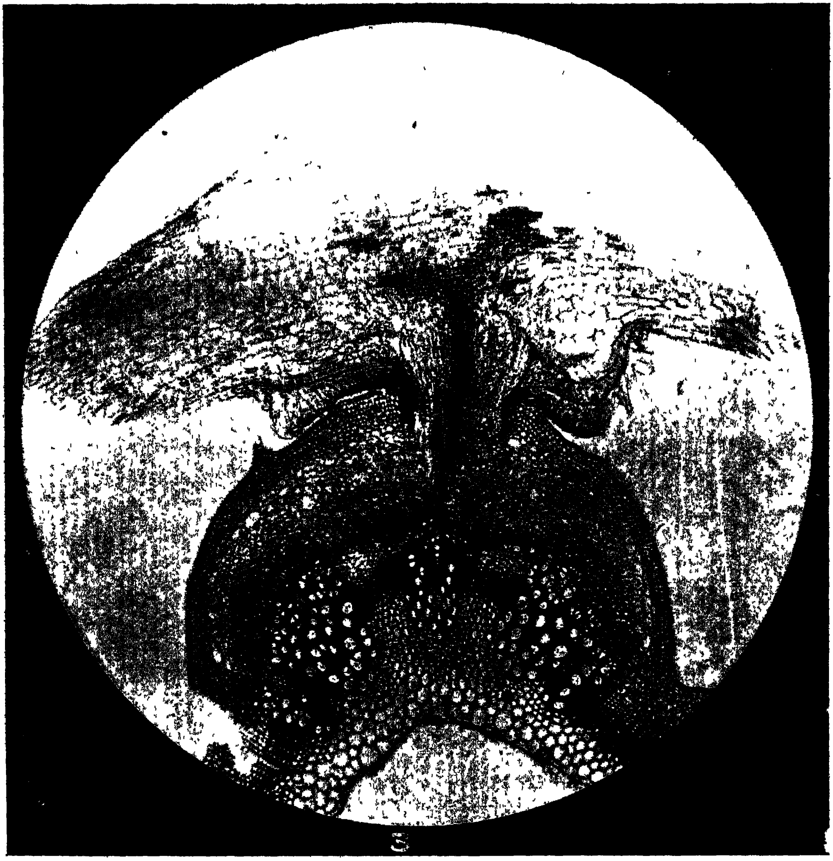


Dodder (*Cuscuta Epithymum*, Murr.) on Lucerne.
Note the twining strands and cluster of flowers. Half natural size.



Dodder. (*Cuscuta appendiculata*) Half natural size dodder then a certificate to the effect that that sample is technically dodder-free may be given. Conceivably, a seed or two of dodder may be yet present in the bulk, but the chances are over 476,000 to 1 against it, as that is the average number of lucerne seeds in a kilogram.

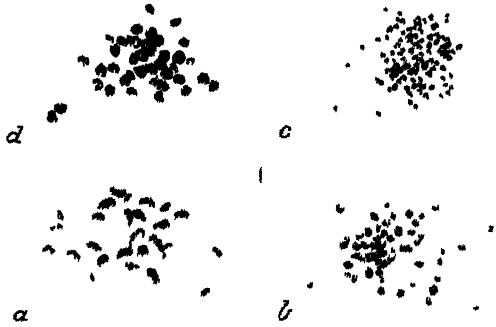
Besides the lurking danger in the seed used, dodder, as stated, occurs on many wild plants in the veld, and is liable to be spread thence to cultivated lands by means of animals, blown seed, or the current of streams. But experience has shown that accidental or natural introduction is much less common than artificial infection, either through seed or from implements brought from foul to clean land through unintentional human agency, irrigation water and the like.



Microscopic section of haustorium of Dodder, showing the sucking organ piercing the stem of the host and its vessels forming an intimate connection with the vascular fibres of the attacked plant. Multiplied thirty diameters.

When small spots of dodder are found either on lucerne or on wild plants they should be taken in hand at once, if possible before flowering. An effective method is to cut the lucerne close to the ground, clearing up the surface and drawing everything from a yard beyond the edge of the affected patch to the centre, and there burn it. If moist or otherwise incombustible, the heap may first be sprinkled with paraffin. Under no circumstances should the cut stuff be carried away, as in so doing, fragments are sure to fall, and so disseminate the disease. If in flower there is danger of ripe seed not being burnt. After a week the spots should be carefully examined lest a fragment has escaped destruction and be spreading again.

Another system is to spray the patches after they have been cut and allowed to wither somewhat, with a 10 per cent solution, 1 lb. to 1 gallon of water, of sulphate of copper (blue vitriol, bluestone) or of sulphate of iron (green vitriol, copperas). Wooden utensils should be used, as metal would corrode. Strong brine is also successfully used. These poisons, of course, kill the host plant down to the ground, as well as the parasite, but the lucerne will spring up again. Arsenite of soda, as supplied by Government for the eradication of prickly pear, is also effective when sprayed over the affected patch. A solution of 2½ per cent., 1 lb. to 4 gallons, kills the dodder, but also destroys the lucerne, which must be re-sown after one or two floodings have washed the poison out of the ground.



Lucerne and Dodder Seed. Actual size. (*a*) Fair sample of Lucerne, imported. (*b*) *Cuscuta arvensis*, foreign origin (*c*) *Cuscuta trifolii*, foreign origin (*d*) *Cuscuta appendiculata*, indigenous.

In the case of a whole patch or field being over-run with dodder, the only procedure to be followed is to graze it down close, plough the land over, and for two years cultivate crops other than lucerne on the land.

But prevention is preferable to cure, and the use of only seed guaranteed free from dodder is imperative. Watchfulness with regard to the presence of dodders on the veld is also an obvious precautionary measure.

The caution and activity of the public in their own interest would no doubt be quickened by the proclamation of dodder as a noxious weed, thus entailing its compulsory removal within a limited time after its discovery. This course has been followed in the Divisions of Oudtshoorn and Cradock, where dodder is now noxious in the eyes of the law, as well as by common consent. The assistance of the public in the enforcement of the Act would be a potent aid in restricting the spread of dodder, and it is to be wished that other districts would follow the above examples.

In conclusion, it is requested that specimens of dodder, both from wild plants and from lucerne, may be sent for identification to the Agricultural Assistant, Cape Town, in order that a complete collection of the forms occurring with us may be made, and their relative frequency approximately estimated. There still remains much to learn about dodder.

PRESIDENTIAL ADDRESS TO THE CAPE CHEMICAL SOCIETY.

Delivered at the Second Annual General Meeting,
Cape Town, 19*th April,* 1907.

By Prof. P. D. Hahn, Ph.D., M.A.

Gentlemen,—The Cape Chemical Society now enters upon its second year, for which you have elected me President. I thank you for this honour and for the confidence which you have thereby shown in me, because the president of a scientific society is always expected to take a rather active part in the Society's work. I can assure you that I am willing and prepared to do so.

I much regret that I was absent from South Africa during the time when the preliminaries of the constitution of our Society were under discussion, and when subsequently the Society was actually called into existence.

The Cape Chemical Society is small when compared with other scientific societies in South Africa, but there is a provision in our rules which gives it strength; it is instituted to promote the study of pure and applied chemistry. This is a very definite object, and all who are willing and able to work for this definite object will be welcome to become members of the Society. Every member of the Chemical Society is a chemist or a worker in chemistry, and this gives strength to the Society. There are in most other scientific societies a large number of members who merely take a so-called "interest in science generally" without professing any particular branch of science. The work done by the societies with large numbers of members is generally done by a few only, and the work is of rather a varied nature, as the agenda papers of the meetings show. In our Society we limit ourselves to one science—chemistry, which has grown during the last 120 years into such dimensions that it requires a lifetime of arduous study to acquire anything like a competent knowledge of this science in its pure and applied form.

In all countries into which European civilisation has penetrated, we find also disciples of chemistry who are mostly engaged in work which directly bears on the agricultural or technical or industrial development of these countries. The same we find in South Africa.

In connection with the gold mining industry of the Transvaal a very large amount of valuable scientific research has been done in the development of the metallurgy of gold. Chemists from Europe, America, and last, but not least, from South Africa, have been actively engaged for the last twenty years to study and to improve to its present perfect condition the cyanide process. Without this cyanide process the gold industry at the Rand would be now non-existent, and without the gold industry at the Rand many events in the history of South Africa would not have occurred, and many things in South Africa which now occupy the thoughts of the people and of individuals would be non-existent. I wonder whether our confreres, the Rand chemists, realise what they are responsible for. In ancient times gold was mainly obtained by washing finely crushed auriferous material or auriferous sand. In 1571 the employment of mercury for the extraction of silver and gold first came into use in South America, and since that date up to the present time the bulk of the mercury produced at the cinnabar mines of Europe and America is employed for metallurgical purposes. For 277 years no progress was made in improving the methods for extracting gold. During this time, only washing and amalgamation were in use. In 1848, Professor Plattner, of the Mining Academy at Freiburg, Saxony, brought out his chlorination process for extracting gold from auriferous pyritic ores. Already after a few years this process was introduced into the American and Australian goldfields, where auriferous pyritic ores occur. From 1848 to 1889 the three principal processes for extracting gold were the hydraulic process, the amalgamation process, and the chlorination process. In 1890 the cyanide process was introduced under Macarthur-Forrest patents at the Rand.

The action of potassium cyanide solution on gold was known for over 100 years. Already in 1782 the great chemist, Carl Wilhelm Scheele, observed the solubility of gold in potassium cyanide solution. In 1840, Wright, of Birmingham, showed that gold and silver were soluble in potassium cyanide solution, and could be thrown down again electrolytically. Prince Bagoatian, in 1843, demonstrated the rapid solution of gold and silver in a solution of potassium cyanide by using the metals as anodes. In 1846, Elsner found that the presence of oxygen was indispensable for the solution of gold in potassium cyanide solution, and in 1879, Dixon discovered the accelerating action of oxidising agents added to potassium cyanide solution. To Mr. McArthur and Dr. Forrest, of Glasgow belongs, however, the merit of having introduced the cyanide process into metallurgy first at the Rand in 1890. The amount of gold extracted by this process at the Rand, was, in

1890	286 ounces.
1891	34,862 ounces.
1892	178,688 ounces.
1893	330,510 ounces.

And at present the cyanide process, thanks to its wonderful development through the indefatigable scientific labour of the Rand chemists, plays so important a role, that the Rand gold industry, with all its consequences, good and bad, would be non-existent but for the cyanide process. At present the gold production of the Rand, of which a considerable proportion is obtained through the cyanide process—a purely chemical process—is larger than the production of gold in any other gold producing country. In 1905, the total production of gold in the world was 595,000 kilogrammes (a cube of the size of about three meters), of which 152,420 kilogrammes were from the Transvaal, 129,940 kilogrammes from the United States, and 128,710 kilogrammes from Australia. The Transvaal owes this position in the first place to the application of the results of research and investigation of chemists. Is it not a fair question to ask: What has been done by those who have benefited from this wealth for the encouragement of chemical study and research in South Africa? The answer will only confirm the mathematically expressed statement: the manifestation of gratitude in this world is inversely proportional to the force of the reasons for showing gratitude.

In the eastern part of South Africa, with its ore deposits and coal fields, we may expect in the near future a very considerable development of technical and especially of chemical industries. The great question which at present engages the attention of chemists more than any other is the utilisation of the atmospheric nitrogen: the change of free atmospheric nitrogen into combined nitrogen. The production of calcium cyanamide from calcium carbide and atmospheric nitrogen and the use of this calcium cyanamide in place of other nitrogenous fertilisers in agriculture marks a great step in this direction. But of still greater importance is the process of utilising the atmospheric nitrogen for the production of nitric acid. At Nodotten, in Norway, the problem has been satisfactorily solved, and in the nitric acid factory of that place is now daily produced a quantity of calcium nitrate sufficient for making one and a half tons of nitric acid. The largest chemical works of Germany, the Badische Anilin und Sodafabrik, of Ludwigshafen, are now erecting, in the Bavarian Alps, at a cost of one and a half million pounds sterling, plant for preparing nitric acid from atmospheric air, in order to become independent of the supply of Chili saltpetre, which, it is supposed will be exhausted in twenty-six to forty-four years. No doubt other chemical works using large amounts of nitric acid will have to follow this example. It is reassuring to know that the supply of oxygen and nitrogen in the atmosphere is sufficient for many thousands of such nitric acid producing works, for the quantity of oxygen and nitrogen over only one square mile of surface of our planet is sufficient to produce nitric acid for an ample supply for the world for sixty years.

At present, South Africa has not commenced to turn the mechanical power of her waterfalls into chemical energy. It is, however, only a question of time when this will be done. The mechanical power available in the waterfalls of the Transkei and Natal, not to speak of the Victoria Falls, is computed to be greater than that of the rivers of Germany and Switzerland together. Whilst the eastern part of South Africa possesses large resources in ore deposits, coal fields and waterfalls, we find, in the western part of South Africa, and more particularly in the Western Province of Cape Colony, no treasures of this kind which hold out promise of future technical and industrial developments. Here in the south-western part of the Cape Colony we have a beautiful climate, a blue, smiling sky, and a poor soil at the few places which can be cultivated without artificial irrigation. Here the student of agricultural chemistry in the widest sense of the word has a large field for investigation and research.

I take leave on this occasion to express my appreciation of the valuable work which has been done by Mr. Juritz in connection with the analyses of soils of the Colony, especially of the grain farming and wine farming districts. These investigations are, if properly applied, of immense material value. Glancing over the tabulated results of the numerous analyses of soils formed by the disintegration of granite, sandstone and clay slate in the south-western part of the Cape Colony, one cannot help noticing the very small percentage of lime in these soils. A little study of the requirements of plants and of the indispensable constituents of plant food will convince us that the supply of lime contained in the virgin soil in these districts is insufficient for the healthy development and growth of fruit trees, as well as of vines. This conviction receives further support if we compare the growth and production of the vineyards and fruit orchards of the coast districts poor in lime with those of the inland districts with their soils containing sufficient lime. What a contrast in the appearance of a vineyard or orchard in the districts of Cape, Stellenbosch, Paarl or Malmesbury, and those of the Ladismith and Oudtshoorn districts! Now the lesson which the results of Mr. Juritz's investigations teach the wine farmers and the fruit growers in the coast districts of the Western Province is, to supply their orchards and vineyards with so much lime in a suitable form as is required to assist in a healthy growth and development of wood, bark and leaf. Vines and fruit trees grown under such favourable conditions will better resist the attacks of fungoid and insect pests, and will also produce a larger quantity and better quality of grapes and fruit.

Viticulture, the principal branch of agriculture in the Western Province, offers to the student of chemistry many and interesting problems, not only with regard to the cultivation of the vine, but more particularly to the chemistry of fermentation of grape juice, the maturing and treatment of wine, the making of brandy and the analyses of wine and brandy. The Cape Chemical Society is evidently alive to its duty to the viticulture of South Africa; even in to-day's agenda paper we find an item referring to the methods of analyses of wine. The work of the chemist, however, should not stop with the analyses of wine. Such analyses of samples of wine without interpretation, without using them for demonstrating or explaining certain processes or changes, which the wine has undergone or admixtures received, are utterly useless. I doubt whether analysts are always conscious of the fact how little can be proved by the analyses of wine as to the methods used in the fermentation, manipulation, blending and in what is called "adulteration" of wine.

If we have to believe what Pliny tells us in his Natural History about wine making, the ancients must have carried on the practice of "adulteration" of wine to a very great extent, because it appears from Pliny that they did not care what they added to their wines as long as it suited their taste. With reference to the use of gypsum, Pliny says: (Natural History Book XIV., para. 19), *Africa gypso mitigat asperitatem nec non aliquibus partibus sui calce.* Now this is still done in Spain up to the present day; in fact, all "sherry" made in Spain has been made by the addition of calcic sulphate (gypsum) to the grapes, or rather to the grape juice. Wines prepared without the addition of gypsum do not possess or develop that nutty flavour which we expect to find in sherry, whilst all wines possessing this flavour have been made by means of the addition of a certain quantity of plaster of Paris *alias* burnt gypsum, *alias* anhydrous calcic sulphate, to the grapes when and whilst they are being pressed. When I was last year in Xerez de la Frontena, the capital of the sherry wine districts, I paid special attention to the methods there employed in wine-making.

The soil throughout these districts is more or less calcareous; in some parts it is almost white chalk, and the wines suffer much from chlorosis, especially those grafted on American stocks and planted on the white chalk. The vines themselves are grown and cut in the same manner as with us. Only the newly planted vines are manured; on the whole the vineyards receive little manure, but the soil is well cultivated.

The ripe grapes are gathered towards the middle of September, and spread on mats of Esparto grass and left for three to four days to dry in the sun. During the night they are covered with mats. The pressing of the grapes sometimes takes place at night, the grapes being cooler and the subsequent fermentation slower. The grapes are trodden by men with heavily hob-nailed shoes, and the marc is finally pressed out. Before the men start treading, a certain amount of plaster of Paris is sprinkled over the grapes, *viz.*. 1 kilogramme of plaster of Paris on 500 liters of grapes. The juice running off, whilst the grapes are being trodden, is used for making the better qualities of sherry, whilst the juice obtained from the press is kept apart for the inferior kinds of sherry and for making brandy and spirits. The first fermentation is over in six to eight days. The young wine is then put in casks of 110 to 120 gallons, which are not quite full, and only loosely covered, the surface of the wine being about four inches from the bung. The characteristic sherry bouquet develops very soon, and is undoubtedly due to the treatment with gypsum, because it does not develop in wine which has not been treated with sulphate of lime. Now what is the part which the calcic sulphate plays in the production of sherry? It is well known that the calcic sulphate acts upon the hydric potassic tartrate forming potassic sulphate, calcic tartrate and free tartaric acid, and the primary action of the calcic sulphate may be represented by the equation:—

$$2HKC_4O_6H_4 + CaSO_4 = K_2SO_4 + CaC_4O_6H_4 + C_4O_6H_4.$$

The potassium sulphate is a neutral soluble substance, whose presence in the wine has been used as an indicator of the extent of the "adulteration" of wine by the use of gypsum by those who call the use of gypsum in making wine "adulteration." The fury of these people once succeeded in decrying the good fame and reputation of sherry so as to induce the authorities to eliminate sherry from the *Pharmacopœia Britannica* and to replace it by alcohol or spirits of wine in certain recipes; until an impartial enquiry into the nature, properties and composition of sherry proved that an injustice had been done to sherry, and it was thereupon reinstated in its former place in the *Pharmacopœia Britannica.* In France, the potassium sulphate test is also used in connection with the import of Spanish wines into France whenever the vintage in France has yielded a superabundance of wine. But when there is a scarcity of wine in France the potassium sulphate test is not so vigorously enforced, and the potassium sulphate has evidently for a time lost its virulence.

The *Lancet* Analytical Commission went most minutely into the merits of the question whether sherry wine is objectionable on account of its ingredients, and particularly on account of the potassium sulphate. In this report, which appeared in the *Lancet* on the 29th October, 1898, a number of analyses of different sherries is given, in which the following percentages of potassium sulphate are stated:—.39, .52, .47, .65, .47, and .76. With reference to the action of potassium sulphate this report contains the following passage:—"There is also to be considered the interesting and important fact that potassium sulphate occurs universally in almost all articles of diet and, as is pertinently pointed out by Monsieur Laborde, cirrhosis, if it be due to potassium salts, should be universal. It is distinctly diuretic and a valuable saline purgative administered in doses from ten to sixty grains. The average quantity in a bottle of sherry of one-sixth of a gallon is forty grains. After all, the potassium sulphate in sherry is an equivalent of the potassium tartrate originally present in the wine, which salt presents similar therapeutic properties to the sulphate." Potassium sulphate is further described as mildly cathartic, usually operating without irritation, and as a useful purgative in jaundice and dyspeptic afflictions. Lastly potassium sulphate is "a hepatic and intestinal stimulant of considerable power, but its action on the liver is uncertain." According to the *Pharmacopœia Britannica*, sherry is directed to be used in the preparation of vinum aloes, vinum antimoniale, vinum colchici, vinum ipecacuanhæ, vinum opii, vinum rhei, vinum ferri. But let us return to the action of gypsum on the grape juice. In addition to potassic sulphate, calcic tartrate is produced, which is a somewhat voluminous combination precipitating other suspended organic matter. It considerably assists in clarifying the wine after a short time. The *Lancet* Analytical Commission has investigated on the spot at Xerez the action of calcium sulphate on the young wine, and analysed also the lees of must with calcium sulphate and of must without calcium sulphate and the young wines drawn off from both. The results of these investigations show:—"The lees of wines, which have been previously treated with sulphate of lime contain a greater proportion of organic matter than the lees of a wine not so treated, consisting of just those matters, such as albuminous bodies, which are likely, if retained in the wine, to make it susceptible to objectionable changes and deterioration. Again, tartrate of lime in lees of previously treated wine occurs largely, but not entirely, in the place of acid tartrate of potassium in the lees of untreated wine, but in the latter tartrate of lime is also an important constituent. The lees of treated wine further contain an increased proportion of free acid." The two young wines which had been produced side by side at the same time, and were racked at the same time, showed a marked difference in the amount of tartaric acid and of potassic sulphate. In the treated wine the amount of potassic sulphate was four times what it was in the untreated wine, and the free tartaric acid was in the treated wine 50 per cent. higher. It is very remarkable how rapidly the total acidity, principally represented by tartaric acid, is increased by the addition of calcium sulphate. I have lately made several tests with the following results:—To 100 c.c. of distilled water were added 5 grammes of acid potassium tartrate and 2 grammes of calcium sulphate, and to another 100 c.c. of water was added only 5 grammes of acid potassium tartrate. After twenty-four hours the treated sample contained .262 per mille more acidity than the untreated, and after forty-eight hours the difference was .337 per mille in favour of the treated sample. In another test, I took quantities more in proportion with the real amounts of acid occurring in wine, and with the amount of calcium sulphate used, namely, 1 in 500. In 100 c.c. of water I placed .8 gramme of acid potassium tartrate and .2 of gypsum, and in another 100 c.c. of water only .8 gramme of acid potassium tartrate. After twenty-four hours the two samples differed by .26 per mille total acidity, and after four days by .30 per mille total acidity in favour of the treated sample. In each experiment it could be observed, how rapidly the supernatant liquid in the treated sample became quite clear, whilst in the untreated sample it remained for a long time turbid from suspended acid potassium tartrate. With reference to the subsequent development of ethers in the treated and untreated wine the report of the *Lancet* Analytical Commission gives us some interesting information. It states:—"There is another point of considerable interest brought out in this analytical contrast, and that is in regard to the ethers. The fixed ethers may be looked upon as contributing the peculiar flavour of wine and the volatile ethers the aroma. The type of the former is ethyl tartrate and of the latter ethyl acetate. Now, although these wines were produced from grapes of the same vintage, were crushed, fermented and racked at the same time and were of precisely the same age—though that was only a few months—yet there is a great and important difference in the amount of ethers. In wine treated with sulphate of lime they are more than double in amount that of the wine not so treated. As already pointed out one effect of treating grape juice with gypsum is to liberate free tartaric acid in the wine. In other words, the fixed acids of treated sherry are largely in a free state, while in untreated sherry they occur in the form of the acid salt of potassium. In the former case alcohol, being in the presence of free organic acid, would, it may fairly be assumed, readily combine with the acid to form ethyl tartrate or other ethers of wine. In a word, the treatment with sulphate of lime stimulates etherification."

The formation of a much larger amount of ethers by the action of free tartaric acid upon alcohol, as compared with the action of acid potassium tartrate, is readily illustrated by the results of the following experiment:—100 c.c. of dilute alcohol 17 volume per cent. are shaken up with a slight excess of acid potassium tartrate and another 100 c.c. of dilute alcohol of the same strength with tartaric acid; at the end of the experiment it will be found that the liquid treated with free tartaric acid contains about three times as much of ethers than the other liquid.

The treatment with gypsum is, however, not the only peculiar feature in the production of sherry, but there is no doubt that it is the most important feature in the making of sherry. I returned too late to arrange experiments in this direction during our vintage which has just passed, but hope to do so during the next vintage, on which I shall report in due course.

There are many other interesting and important questions in connection with viticulture which can only be solved by chemical research. Closely connected with some of these investigations are those which refer to the physiology of yeast, the nature and action of different kinds of yeast for different wines. This matter receives at present much attention in the viticultural schools, colleges, and experimental stations in Europe. It is to be hoped that also with us these researches will be taken up, as there are now earnest attempts made to promote and improve the methods of making of wine at the Cape. Much has been done already in this direction, and every agricultural show during recent years proves that a marked progress is made in the production of wine, and that the production of sound, natural wine is now much larger than it was ever before.

But, after all, the production of wine at the Cape is but small, and cannot be compared to the production of wine in France, Spain, Italy, Hungary, Austria and Germany. It is about the same as that of the Crimea, and the area of land planted with vines at the Cape is about equal to the area planted with asparagus in the Duchy of Brunswick. But large or small, we must strive to secure for Cape wines a first place as to quality, and in this direction members of the Chemical Society can give much and valuable help and assistance.

Return of Fruit Shipped from Cape Colony to England during April, 1907.

Port of Shipment.	No. of Packages.	Description of Fruit.	Quantities.	Value
				£ s. d.
Cape Town	5,961	Grapes	97,530 lbs.	1,182 0 11
"	2,321	Pears .. .	69,160 (No.)	347 7 0
"	14	Apples	390 "	2 2 0
"	3	Quinces	60 "	0 9 0
"	10	Pomegranates ..	400 "	2 10 0
"	12	Watermelons .	240 "	1 10 0
Port Elizabeth ..	3	Mixed Fruits .	112 "	1 0 0
	8,324			1,531 18 11

EXPERIMENTS WITH OSTRICHES.

II.

By PROFESSOR J. E. DUERDEN, Rhodes University College,
Grahamstown.

In any intelligent discussion of the defects in ostrich feathers there is one aspect which frequently presents itself, namely, how far are the defects constitutional as regards any individual bird; are they part of the nature of the particular bird, or can they be eradicated from one and all by suitable treatment? The question has often been put to ostrich farmers in the following manner: Given an ostrich, the feathers of which under ordinary circumstances are strongly barred, is it possible by any kind of better treatment fully to eradicate the bars in a later clipping? No farmer has yet replied in the affirmative to such a question. The matter is one of fundamental importance, and an experiment just concluded sheds upon it a certain amount of light, though it is by no means to be regarded as conclusive in its bearing upon the whole problem.

Three cock chicks of very ordinary strains were taken from a mixed lot of different parentage when only two or three weeks old. They have since been reared under exactly similar conditions, and well fed and cared for, but without any further special treatment. The chief problem was to determine whether good care and a liberal supply of proper food, so far as we know it, would suffice to eradicate the bars. The chicks have been brought up under close observation, have been kept free from parasites of all kinds, and been healthy all the time with no drawbacks so far as could be determined. They are now (June) about eighteen months old, and are considered by expert breeders to be in remarkably fine condition, and in many ways further advanced than is usual for chicks of this age, especially as regards their plumage and the appearance of the sexual characters.

The first clipping took place at seven months, on the 4th August, 1906, though from the ripeness of the feathers it could have been performed a month earlier. A comparison of the spadonas at once shows that the chicks are of three different strains, which may be distinguished as A, B and C. The feathers of chick A, though by no means of a superior type, are better than those of B and C. They are of only moderate length, width and density of flue, and strength of barbs, and are almost entirely devoid of bars. The feathers of chick B are longer, with a narrow flue tapering much towards the free end, and most of them are a little more barred than those of chick A, though the individual bars are very feeble. The feathers from chick C are of an inferior type, long, with a coarse, narrow flue, the barbules often feebly developed, and incipient barring very prevalent.

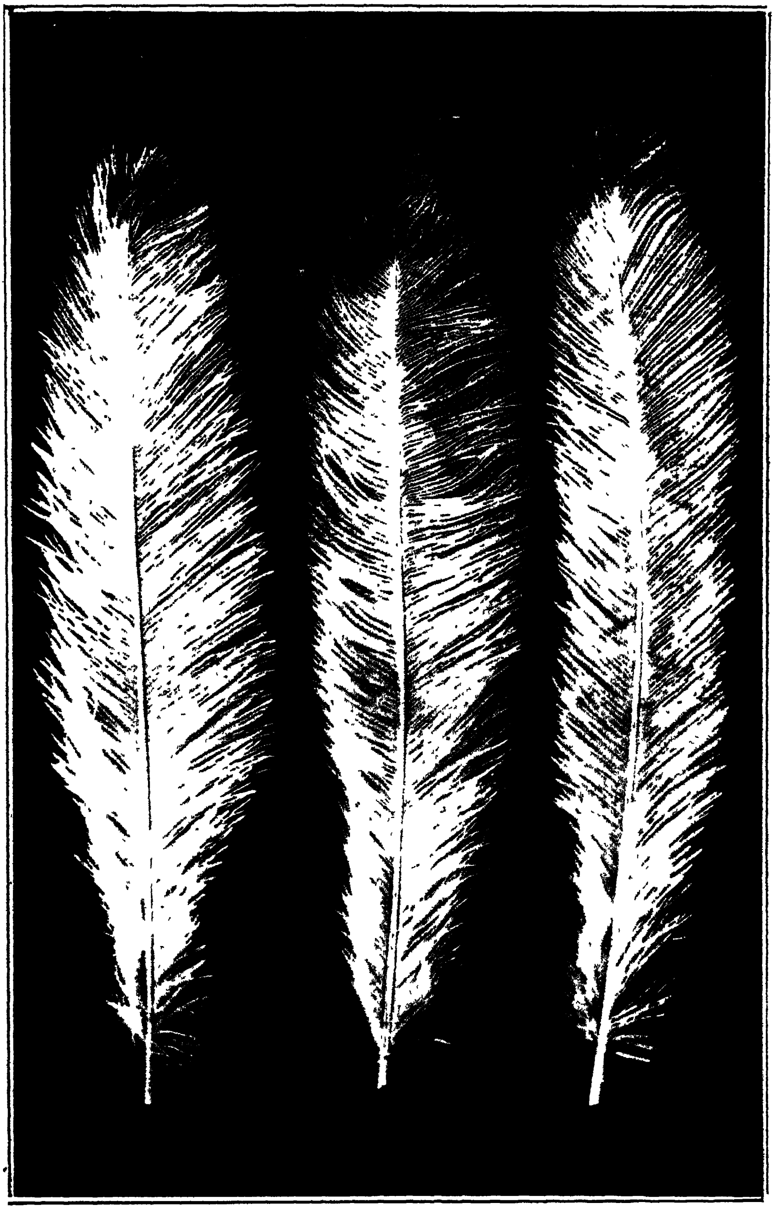
Thus, though fed and treated alike, the three chicks produced feathers of very different quality to the eye of the expert, proving the great importance to be attached to the particular breed of bird for superior feather production. Further, though the bars are by no means pronounced on any of the three clippings, they are present in an incipient degree on all, their prevalence differing much in the three birds. Barring, therefore, to a certain extent is also dependent upon the breed of the bird, and may occur before quilling has ever taken place.

The first quills of the three chicks were not drawn in any regular manner. It is often asserted that quilling has much to do with the production of bars; moreover, as in the wild natural state of the bird only a limited number of the feathers are growing at any one time, it seemed not unlikely that by allowing the quills to fall out naturally, a better feather might be the result, since there would seem to be more nutrition available for the less number than where all the feathers are growing at the same time. For experimental purposes, therefore, a number of the quills were allowed to fall out naturally, a few were drawn before fully ripe, a few after the new feather had already commenced, and the remainder were drawn after the other feathers had been growing for two or three months. Thus, the new feathers are of very irregular sizes. On the 9th April, 1907, eight months after the first clipping, a number of the second lot of feathers (juvenal feathers or first-after-chicks) were fully ripe, and fifteen were clipped from chick A and about a dozen from each of the chicks B and C.

The second results are interesting. The juvenal feathers from chick A are of good quality, and are altogether free of bars, with the exception of three or four, which are feebly barred. Of the feathers from chick B, more than half are free of bars, and the others are barred a little more deeply than those of A. Among the twelve feathers from chick C, only one can be considered as altogether free of bars, the others being defective to a greater or less extent. Thus, the comparative merits and proneness to barring of the feathers from the three chicks already found to obtain in the spadonas is repeated in the juvenal or second clipping. This gives some justification for the belief that the defects are constitutional as regards any individual bird, or at any rate are constitutional to such a degree that they cannot be eradicated by ordinary care and feeding.

Another result of the experiment to which special attention needs to be directed is the great variation as regards defects among

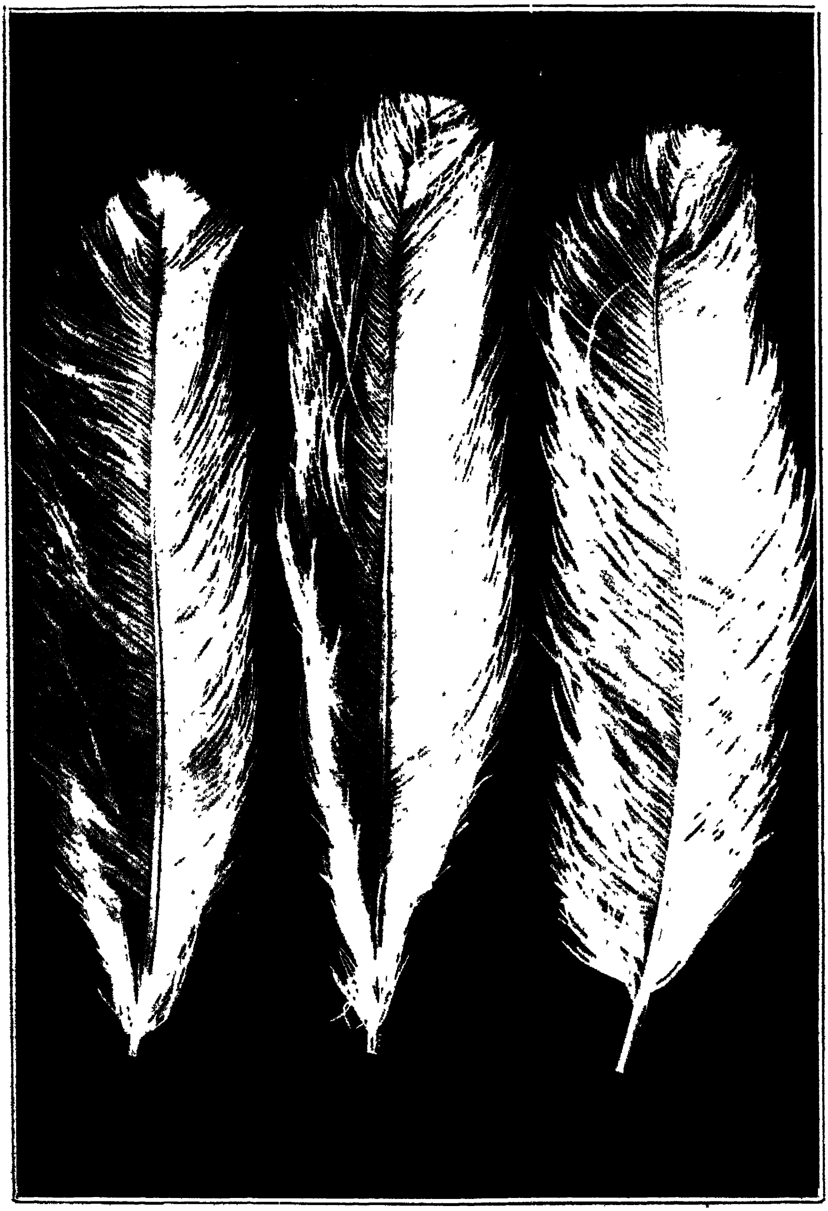
PLATE I.



A. B. C.

Spadonas.

PLATE II.



A. B. C.

Juvenal Feathers or First after Chicks.

the many feathers taken from any one bird. Thus, from each bird have been obtained feathers which are altogether free of bars, others in which a few occur, and still others in which they are very prevalent. It is undoubtedly difficult to account for these differences unless they be in some way connected with the quilling. May it not be that the feathers altogether free of bars are from sockets from which the spadona quills were allowed to fall out naturally, while those most badly barred are from sockets in which the feather-germ or socket was injured, either by the quills being drawn too early or too late? This is clearly a very important matter, and experiments are being arranged to settle the question. No doubt many farmers have experiences upon the influence of previous clipping and quilling upon the subsequent feather-growth, and it is desirable that these should be known. From the knowledge we now have as to the conditions under which bars are produced it seems highly probable that an injured socket or feather-germ will result in a defective feather later. An injury to the smaller blood vessels of the feather-germ and its surrounding structures may readily lead to a slight re-arrangement of the vessels supplying the nutrient fluid.

Another observation which may be mentioned is also connected with the difference in the prevalence of defects among the many feathers from the same wing. It is usually found, especially in the case of spadonas where there has been no quilling, that the feathers towards each extremity of the wing are much more likely to be barred than those from the middle of the wing. This is clearly a natural tendency in the bird, and is probably connected with irregular distribution of the blood pressure.

These considerations raise another question which calls for solution, namely, are the feathers from the same feather-germ always of the same comparative quality, that is, will the socket giving a defective feather at one clipping give a similar defective feather at the next clipping, or a socket giving a perfect feather at one time always produce a perfect one? This, of course, presupposes fairly similar external conditions during the growth of the different clippings. The accurate determination of this calls for careful comparison of the feathers from each individual socket during several clippings, and it is hoped that the experiments will throw some light upon it.

Farmers know full well that their clippings of some years are throughout superior to the clippings of other years from the same birds; so that one must never forget that external circumstances, particularly as regards an abundance of suitable food and uniformity of conditions, have much to do with feather production in addition to the constitutional tendencies of the bird. The ultimate aim must be to acquire such a knowledge of the physiology of the bird as to control both the internal and external circumstances so that the farmer may look forward with certainty to the production of a feather free of all defects.

The conclusions to be drawn from the preceding experiment are recognised in a general way by many ostrich farmers, yet being founded on actual data it is well they should be stated in definite terms.

CONCLUSIONS.

1. Bars in feathers appear to be largely constitutional from clipping to clipping, as regards any individual ostrich. Under exactly the same experimental conditions the defects will be absent from some birds, feeble in others, and strongly marked in still others.
2. The defects appear in the absence of any internal or external parasites, without any quilling having taken place, and even when the bird is apparently in a high nutritive condition. It does not follow, however, that some means may not yet be forthcoming to counteract such tendency to defective growth.
3. On the same wing and at the same clipping some sockets will contain feathers altogether free of bars, and other sockets will give rise to feathers which are full of defects.
4. There is some reason for supposing that the variations in feathers from the same wing are partly associated with injuries or disturbances during quilling. Whether the same feather-germ will always produce the same defective or perfect feather yet remains to be determined.
5. There being such a great variation among ostriches as regards their tendency to produce defective feathers, the principle of selection in breeding is strongly enforced.

REPORT OF THE DAIRY TEST AT MOLTENO AGRICULTURAL SHOW MARCH 19th 1907.

By R. SILVA JONES, Government Dairy Expert.

The Molteno Agricultural Society has the credit of being the first Society to include a "Dairy Test" of this nature in their prize list. The conditions and results of which are fully given below.

With reference to the actual competition, only four animals were entered, though the value offered in prizes was undoubtedly good. This can, I feel sure, be attributed in part to the novelty of the competition, and in part to the fact that the majority of the cows in the district had calved early, many of the cattle owners not realising that the points given for lactation were intended to place such cows on an equal footing with those more recently calved.

The object of the test, which is in principle similar to such tests as carried out by the Dairy Show in London annually, only the detail had to be altered to suit local conditions, was to prove to the farmers that it is impossible to judge of the real value of a cow for butter making purposes without the use of the Babcock Tester, together with a system of weighing the milk of each cow separately. Though this may appear at first sight to be a terrible undertaking, it is in reality no such task at all, and can easily be caried out by any dairy farmer without much extra trouble or labour being involved. Many farmers will, and often do, say that they can gauge the true value of a cow equally as well by the condition of the calf drinking upon the cow in question. In some slight degree this may be a rough guide, but there are many things which militate against such a crude estimate, which, coupled with the native labour that is at our disposal for milking, will render it valueless and helpless for the true valuation of such a beast as a milk cow.

This test was a very favourable one indeed, for the demonstration of the dairy value of the cows competing as against the appearance of such animals for the dairy, as in the case in point I am convinced that ordinary cattle judges, judging purely by the eye, would have placed the Shorthorn and the Shorthorn-Friesland cows first and second, and the winner would have been lost. The winning cow was, to the casual untrained eye, merely a common cow of a hardy type, but in reality she is a cow of exceptional merit, as anyone will admit, as she is purely a veld cow, and, I am informed, a regular breeder of good calves, and under these conditions gave at the rate of 7¾ lbs. butter per week, the calf being at that time more than five months old, and she had already carried another calf for three months. To the eye of anyone versed in the good points of a butter cow, she was obviously above the average. The second prize animal, a small heifer, though promising well for butter, was not of the stamp required by the ordinary farmer, and lost points accordingly. In the Inspection awards, as will be seen by the scale of points, she received no marks under that heading.

The other two cows were nice animals, and the Shorthorn-Friesland would have taken the prize for the weight of milk, had the milk not tested below the limit of 3 per cent. of butter fat in accordance with the conditions of the competition.

For the information of readers, it may be well to note that the two winning cows were milked with their calves at their side, and the other two without, and that a portion of the milk from the Shorthorn-Friesland cow was spilt by the boy milking, which naturally reduced the weight of milk given.

If the dairy industry is to develop to its fullest extent, the value of these trials cannot be too highly rated, and if the importation of dairy produce is to be stopped, one of the first and foremost problems that must be faced in a practical manner is the improvement of our dairy herds. It is the foundation of success for dairy farmers to keep and breed from cows only that pay their owners to keep them, and not to have, as one often sees, a large troop of dairy cows where a number pay, by the value of milk produced, to keep, and a number do not, the non-profitable ones not only are a loss to their owner, but reduce the profit made by the good ones.

For many years the cattle of the country have been bred almost entirely for transport oxen. The days of this traffic are now passed, and it behoves all to turn their attention to the up-breeding of these herds into herds of cows of really good milking qualities, by selection and judicious cross-breeding, and it is for this reason that I attempted to get a class of this description added to the prize lists of our agricultural shows.

The present-day outlook for cattle farmers is without doubt to be found in dairying, and for this reason considerable weeding out and selection will be necessary before anyone can claim to have established a troop of really good dairy cows, and not until this is done will the cattle farmer reap the full benefit in return for his money invested. The improvement of late years is undoubtedly most marked, but still it has not yet been generally accepted as a factor towards success Many still believe in the old-fashioned idea that the common cattle are the breed most suited for the country, and that they will bring in equally good returns in the dairy as better bred ones, and that they will live and thrive under circumstances almost impossible to the better bred ones. There may be, and is, perhaps, some little truth in this, but still, I am of the opinion that it is very greatly exaggerated. It, nevertheless, stands to reason that the housing and feeding of dairy cows is immensely important, and will have to be sooner or later carefully thought out before a large flow of milk can be assured for the whole of the lactation period.

These few lines have been written, and the full report of the first trial of this dairy test at the Molteno Show appended for the consideration of all dairy farmers, and in the hope that other Agricultural Societies may see their way clear to include this important class in their show lists, which will, I am sure, tend towards the improvement of our dairy cattle that is so much required.

RESULT OF DAIRY TEST, MOLTENO SHOW, 1907.

Breed.	Age of Cow.	No of days in milk.	Milk yield in 24 hours.	Percentage of Butter Fat.	Butter yield in 24 hours.	Points for Lactation.	Points for Milk.	Points for Butter.	Points for Inspection.	Total points for Milk.	Total points for Butter.	Total points for Butter and Inspection.	Awards.
	yrs. mos.		lbs. oz.		lbs. oz.								
Jersey-Africander.	6 0	158	18 0	5·6	1 1⅝	11½	18	17½	8	29½	29	37	1st Prize—Butter Test. 1st Prize—Points for Butter. 1st Prize—Points for Milk.
Jersey.	2 3	110	12 0	6·0	0 12	10	12	12	nil	22	22	22	2nd Prize—Butter Test.
Shorthorn.	3 0	48	19 8	4·0	0 11¾	¾	19½	11¾	8	20¼	12½	20½	
Shorthorn-Friesland.	9 0	103	19 8	2·4	0 6⅓	6	nil	6½	8	6	12½	20½	

CONDITIONS FOR DAIRY TEST.

CLASS 52.

1. Unless otherwise stated, exhibits in this class are subject to the regulations governing the prize list.

2. A signed certificate stating date of last calving must accompany each entry, and the age and breed of the animal and the name of the breeder should be given if possible.

3. The competing animals must be in their places on the show ground by 5 p.m., on the evening of the second day prior to the show day. They will be then milked dry in the presence of the committee appointed.

4. On the day before the show the morning's and evening's milk will be weighed, tested and separated. Each lot of cream will be churned separately and the awards made according to the scale of points as stated.

5. On the morning of the day of show the cattle judges will inspect this class, and place the exhibits in order of merit as regards their suitability to the requirements of the district in accordance with the "Instructions to Judges."

6. The awards will be posted by 1 p.m. on day of show, and the number of points gained by each exhibit will also be posted.

7. During the test day no calves will be allowed to drink; but for calves under two months of age special provision will be made for giving them separated milk if the owner desires. Exhibitors will be at liberty to allow their exhibits to run on the veld or to feed them in any way they approve previous to and during the test. But they must remain in the show yard during the night prior to the test.

8. The awards will be made on the total number of points scored, except the special prizes offered for the exhibits scoring the most points exclusive of inspection points. These awards may also be given to an exhibit taking either of the other prizes, provided the conditions are complied with.

9. No prize will be awarded to any exhibit scoring less than eleven points. But as no data is available, the Show Committee reserve the right of lowering this minimum if considered necessary.

10. In the case of exhibits obtaining the same number of points, the prize to be awarded to the animal that has been the longest time in milk.

11. Exhibitors will be allowed to remove their exhibits after the second test milking, but any award that may be made will be forfeited should the exhibit not be in its place by 8 a.m. on the day of show. The milk of the two test milkings to remain the property of the Society. Attention is directed to prize list rules, especially 3, 4, and 12.

SCALE OF POINTS.

Butter Test.

1. One point will be awarded for every ounce of butter produced by the churn test.
2. One point will be awarded for every completed ten days since calving after deducting the first forty days.
3. Maximum allowance for period of lactation, twelve points.
4. Fractions of ounces of butter and incomplete periods to be worked out in decimals and added to total points.

Milk Test.

1. One point will be awarded for every pound of milk testing 3 per cent. or more of fat.

2, 3, 4. Similar to scale of points in butter test.

Inspection Test.

Eight points will be awarded to each exhibit placed in the first class.

Six points will be awarded to each exhibit placed in the second class.

No points will be awarded to each exhibit placed in the third class.

INSTRUCTIONS TO CATTLE JUDGES.

The judges are desired to inspect all the exhibits in the dairy test and select those which they consider specially suited to the requirements of the district, and bracket these equal first class.

Then to select those which they consider indifferently suited, and bracket them equal second class.

Then to select those which they consider totally unsuited, and bracket them equal third class.

All the exhibits must be included in either first, second, or third class, but as this is not a competition inspection, it is open to the judges at their discretion to omit either class if there are no animals which, in their opinion, would come under that class.

Breed, condition, colour, age, are not to be taken into consideration.

But attention is directed to such points as denote constitution, ability to travel, such as legs and form of body, value of animal for breeding and fattening.

C. A. Pope.
W. B. Gunn. } Joint Hon. Secs.

SPECIFICATION OF HORSES
REQUIRED FOR PURCHASE
BY THE MILITARY AUTHORITIES.

Horses of three classes are required, *viz.*:—

Draught; Cavalry; and Mounted Infantry.

Draught	.. ..	15 hands to 15-2.
Cavalry	.. ..	14-2½ to 15-2.
Mounted Infantry	..	14 to 14-2½.

The class of animal required in each of the three classes may be generally described as short-legged, compact bodied, practically sound, with good constitution and bone to match his size, not under four years or over seven years.

The matter of the horses being broken or unbroken is immaterial, but any horse brought forward for sale must be so far handled that the Veterinary examinations as to soundness in walk, trot, or gallop can be carried out without delay in the presence of the purchasing officer.

A purchasing officer would be the sole judge of the suitability or otherwise of the animal produced for sale, and he would not buy any animal having any of the following defects:—

(a) Small weak quarters; (b) Flat sides; (c) Long, weak or very straight pasterns; (d) Split up and leggy; (e) Small bones or joints; (f) Close hocks or action; (g) Narrow chest; (h) Signs of brushing; (i) Small or uneven feet; (j) Vice of any kind; (k) Bad withers or signs of fistulous withers; (l) Bad condition; (m) Mis-shaped mouth, or mouth showing evidence of operation to teeth; (n) Capped elbows or very short docks.

Mares and Geldings will only be bought, and colour is immaterial.

The Military Authorities will prefer to deal direct with the breeders, and would purchase at any time of the year, and if local Agricultural Associations could at their meetings ascertain what animals could be offered for sale and what centre and date would be most suitable, and notify the same to the Assistant Director of Remounts, at Headquarters, Pretoria, arrangements would then be made for a purchasing officer to attend, but it would be advisable for a month's notice to be given and the collection of horses for inspection should be, having due regard to the sellers' convenience, as near the line of railway as possible.

Local Associations should first ascertain from Assistant Director of Remounts, Army Headquarters, whether horses are required.

No fixed price can at present be laid down owing to the scarcity of the class of animal required in this country, but a fair market price would be offered, having in consideration the price of horses available for importation from oversea.

The Military Authorities will not complete the purchase of any animal till it is delivered alive, without injury (which would render it permanently unserviceable), and free from infectious or contagious disease, at a railway station to be fixed by the purchasing officer.

For the care and feeding of such horses as may be selected for purchase and which for any reason it may be impossible to at once entrain, an allowance of 2s. per day will be made to the seller, such allowance not to be payable for the day of purchase, but will be allowed for the day of entrainment, provided that 10 lbs. of forage suitable for use on the journey be certified by the entraining officer or conductor to have been placed at his disposal.

The seller will pay for any cost of hire of ground for inspection purposes, and must put a halter or other suitable head-gear on the horse to secure it on the railway journey.

He must also allow the horse to pass the Mallein test with Mallein supplied by the Army Veterinary Department, and this test will be applied before entrainment. Should re-action take place within seventy-two hours, the purchase will not be completed, and the feeding allowance of 2s. only would be paid from the date subsequent to selection to the date certified of re-action.

The purchasing officer on selecting a horse as suitable will at once mark a horse so selected with a burnt brand on the foot, and take a description noting all marks on the animal, but such brand will not complete the sale if the safe delivery and Malleining conditions are not carried out.

The purchase money will be paid by cheque by the Assistant Director of Remounts, Pretoria, immediately on receipt of notice from the purchasing officer that the purchase conditions have been completed.

E. N. Bankes, Lieut.,
Staff Officer, Remounts,
For Assistant-Director of Remounts, South Africa.

BOTANY

POPULAR AND INTERESTING ITEMS OF KNOWLEDGE.

By F. W. FitzSimons, F.Z.S, F.R.M.S, etc. (Director, Port Elzabeth Museum)

Plants, like everything else around us, have evolved from an exceedingly rudimentary state to their present degree of perfection. The vegetation which thrived upon earth millions of years ago, and which is now found in the coal measures and the strata of sedimentary rocks, etc., was very crude and lowly-organized compared with most of the present-day vegetation. Man has brought his superior intelligence to bear upon wild plant life and by careful selecting, special culture, and crossing, has succeeded in largely increasing his store of food material. He has succeeded in producing a large variety of luscious fruits from what were once small, hard and almost uneatable. He is constantly adding new vegetables to his kitchen garden by cultivating some wild plant, forcing its growth, etc., until he produces a good garden vegetable. The cabbage grows wild in the South of England, among the chalk cliffs, and in its wild state it is small, tough and unfit for human food. By careful selecting and planting in good, rich soil, we not only have increased its size very considerably, but we have adapted it for digestion by the human stomach, and produced a large number of varieties.

In the Middle Ages, Sir Walter Raleigh, when on a voyage of discovery, found a plant growing in the mountains of Peru which produced small hard tubers about the size of hazel nuts which the natives boiled and ate. He brought some over to England with him, and planted them on one of his estates in the North of Ireland. These were potatoes, which now form the staple diet of the Irish, and which are now eaten universally by the Western races. With careful selection, culture and rich soil, they have not only developed enormously in size, but there are large numbers of different kinds which have all sprung from those wild potato plants growing in the mountains of Peru.

Knowledge is Power.

Many farmers till the soil, grow their crops, rear their stock, etc., just as their fathers and forefathers did, and refuse to profit or allow their sons to profit by the vast amount of knowledge gleaned by experimentation and investigation. In every line of life, in town or country, the men who keep themselves abreast of the times and posted in regard to the latest discoveries, improvements, etc., in their special line of business, invariably leave their conservative brethren far behind in the race of life. A farmer who knows nothing of the science of the rotation of crops very soon exhausts the fertility of his soil, and has perforce to spend large sums of money in fertilizers. When the destructive locusts first began to invade South Africa, the Natal Government, acting, I believe, in conjunction with the Cape and Rhodesia, approached President Kruger with the view of combining in order to bring science to bear in the extermination of the locusts by employing the most approved methods of destroying them. The then Transvaal Government replied that the locusts had doubtless been sent as a punishment for their sins, by God, and that He would cause them to be removed when he saw fit, and to try to exterminate them would be blasphemy. The spirit which prompted this course of action was noble and good, but it must be remembered the Creator does not intend that we shall gain our subsistence without personal effort. It is only by striving and overcoming difficulties that we learn and develop our intellect, and discover and apply the secrets of Nature.

HOW VEGETATION GROWS.

The roots of vegetation are the feeders; they spread out and absorb the various elements in the soil which happen to be required by the plant. If the soil be poor in the special elements required, then the plant suffers in consequence. The various inorganic matters absorbed are held in solution by the water in the soil. When the water is sucked up, the elements go with it, and are carried to the leaves, which chemically change them converting the inorganic, practically dead matter into living organic cells. The leaf also aids vastly in the gathering of food material. Leaves are studded with countless numbers of pores or breathing holes, and under the stimulus imparted by strong white light and sunlight, they absorb the carbonic acid gas out of the atmosphere and use it up, converting it into carbon. This carbonic acid gas is produced by the decay of animal and vegetable matter, and the air which we breathe out of our lungs is also charged with it. When we breathe air into the lungs, the oxygen gas which it contains is immediately absorbed into the blood, a chemical change at once takes place whereby the dead, impure, poisonous matter is converted into carbonic acid gas, and breathed out. The plant, on the contrary, absorbs and feeds upon this deadly carbonic acid gas, so what is food for plant life is deadly poison to all animal life, and *vice versa.*

This is an instance of how wonderfully Nature balances herself, for if all plant life became extinct every living thing upon this earth would perish from two causes—starvation and carbonic acid gas poisoning.

The carbonic acid gas absorbed by the plant is chemically changed, and in the process, oxygen is given off and carbon formed, which, in conjunction with the mineral matters absorbed from the soil, forms the food substances called starch, which produces fat and evolves heat when consumed by animals. The substance in grass and other cattle-food which fattens them is mainly this substance—starch—which is stored up in their tissues. In various plants the starch is stored up in large quantities and in a concentrated state, such as the grain of wheat, mealie, potato-tuber, etc. Knowing this, scientific agriculturalists are always aiming at increasing the size and bearing powers of plants in order to obtain as great a yield as possible for every individual plant.

The leaves of plants have yet another use. In very hot weather the roots take up far more moisture than is required by the plant. This is disposed of through the pores in the leaves; the process is termed transpiration, and takes place very actively on sunny days. When the soil is dry, the nature of the leaves undergo a change, and very little moisture is given out, and to make up for the shortage due to the dryness of the soil they absorb a considerable quantity from the dew which falls upon them at night.

Many plants have very hairy leaves, such, for instance, as the "Everlasting" and the "Silver Tree." This hairiness has a double purpose, *viz.*, reducing the heat of the sun, and thus retarding evaporation of moisture, and collecting the dew at night; hence the reason plants with very hairy leaves are able to withstand a drought which would kill off most other plant life.

THE FERTILIZATION OF PLANTS.

It is needless to enter into an explanation of the various parts of the flowers of plants. The plant produces flowers; in these flowers are stigmas and stamens with anthers. The stigma is the female organ, the stamen is the male stalk, the anther is a little pouch usually double which contains the pollen. This pollen is the fertilizing substance or "seed" which, when transferred to the stigma, fertilizes it. Nature works in a very exact, methodical manner. At the very time the female portion of the flower is ready for impregnation, the pollen becomes perfected, and is capable of fertilizing the stigma.

Many plants produce male and female flowers separately, such as the pumpkin and pawpaw. Unless flowers become fertilized with the male element called pollen, no seed is ever produced. There are four ways by which Nature provides for the fertilization of plants. The first is by means of bees, other insects and birds. The wonderful methods employed is more than marvellous. In order to attract the insects and birds the flowers become large and bright-coloured, so as to be as conspicuous as possible. They are provided with special glands situated right at the bottom of the flower which secrete honey and store it up. Now, in order to obtain this honey the insect is obliged to thrust its head right into the flower, and, the instant it does so, the stamen of the flower bends over and tilts a shower of pollen on to the head or back of the insect or bird. The insect, usually a honey bee, flies off to another flower in a further quest for honey, and as it enters a flower some of the pollen is brushed off on to the sticky stigma or female organ of the flower, and is thus fertilized. Among birds, the Sun Bird, otherwise known as the Honey-sucker, is the principal agent in fertilizing plants, particularly those which are long and tube-shaped, which it is difficult for insects to penetrate; these birds also do considerable service in the destruction of noxious insect pests, and therefore, should never be interfered with.

The second method of fertilization is by means of the wind. The pollen is wafted away in the breeze, and being so very abundant, some of it generally manages to be captured by a female flower. The flowers usually fertilized by wind pollination, as it is termed, invariably have the stamens in one flower and the stigma and pistil in another flower, that is the male and female flowers are separate.

The flowers fertilized by this process are very inconspicuous, and, therefore, do not attract the notice of insects, consequently they are not nearly so likely to be fertilized by insects as their more handsome and attractive cousins. Other flowers fertilize themselves, the female and male organs are so situated in each flower that the pollen is enabled to be easily transferred to the stigma or female part of the flower. Crossing can be performed to a certain extent, and is sometimes done by insects, more often by gardeners who desire to produce larger and brighter blooms, as this crossing greatly stimulates the plant, but, like all forms of artificial or unnatural stimulation, whether of plant or animal, the consequence is that in a few years the plant deteriorates, so much so that the seed fails to germinate, and the artificially stimulated plants die out.

Occasionally flowers are fertilized by the pollen being carried by water. A certain flowering sub-marine plant is fertilized in this way.

Many flowers are spotted and streaked with some brilliant colour, in particular places only. This is not a freak of nature. It will be found on examination that these streaks invariably indicate the passage-way down to the nectar, and the insect in quest of honey knows the meaning of them—they are Nature's sign posts.

The adaptation of Nature to circumstances is very interesting, and clearly shews that in the battle for existence the fittest come to the fore. If animal and plant life does not progress and endeavour by every legitimate means to adapt itself to circumstances and make practical use of every little aid, then it must perforce fall to the rear, and eventually perish.

Certain flowers which are frequently visited by any particular species of bee will gradually alter their shape and form, and in the course of several generations the flower will provide an entrance to its interior which fits the body of the bee to perfection, which means that such flowers would become especial favourites of the honey bees, and consequently stand a far better chance of being thoroughly fertilized.

PLANTS AND DRY REGIONS.

Plants, like animals, gradually become acclimatized. They adapt themselves to their new surroundings in a variety of ways. If the climate be very dry and hot, the leaves become smaller and tougher, which guards against too rapid absorption of their moisture by the dry air and sun. A plant commonly used about Cape Town for hedges, called Hakea, which originally came from Australia, is a sample. Many plants are able to withstand very prolonged droughts owing to having developed the power of storing up water within themselves. The prickly pear, Hottentot fig, and the aloe store up water very abundantly in their leaves. The aloe, in addition, secretes a juice which when boiled out yields the drug called "bitter aloes," which has purgative properties. A plant called the Cape wax-berry secretes a coating of wax on its berries, and the grape also, which is called the "Bloom." This coating helps to prevent evaporation of the moisture.

The various underground bulbs of plants are nothing but storehouses for water. The Pelargoniums, which are lily-like plants, develop bulbs when growing in rocky, dry localities, but all the varieties growing in good soil and abundance of moisture have no bulbs, as they are not required. A variety of onion grows in the hot sand near Cairo, the temperature of the sand being often as high as 130 degrees Fahr. In order to conserve its moisture, the outer scales of the bulb are hard, tough and leathery.

EASTERN PROVINCE BOARD OF HORTICULTURE.

OFFICIAL REPORT of the Board meeting held on the 15th May, 1907, in the Town Hall, King William's Town, Congress adjourning on the morning of the first day to consider the Constitution of the Boards of the East and West respectively.

Present: Mr. James Leighton (President) in the chair, and Messrs. J. Landrey, jun. (Vice President), H. H. Hards, J. H. Dugmore, F. Ginsberg, M.L.A., H. G. Flanagan, G. W. Turpin, P. M. Kruuse (Board members), with delegates to Congress: Messrs. T. A. Stephen, Major-General Sir E. Y. Brabant, M.L.A., Messrs. M. Davies, H. Ella, J. E. W. Venables, F. D. Lingwood, A. Stegmann, H. Dugmore, J. N. C. Hardwich, F. Grace, J. Slemment, W. T. Leighton and the Hon. Secretary (W. B. R. Goulden).

The minutes of the previous meeting were taken as read and confirmed.

THE RULES.

The Secretary pointed out that Mr. Landrey's objection to the ruling of the chair with respect to the draft rules considered at the Cradock meeting had been duly recorded.

The meeting then dealt with the draft rules seriatim, and Rules Nos. 1, 2, 3 and 4 were passed as read. In rule 5, *re* Executive, the words "two or more members of the Board with" were deleted. Rule 5 now reads: "That the Executive consist of the President, two Vice-Presidents and the Secretary ex-officio, who shall meet at such times and places as may be found necessary." Rules 6 and 7 were passed as read. Rule 8 was altered to: "That representatives be elected by the Associations in each district prior to Congress, such representatives to take office after the annual Congress." Rules 9 and 10 were passed as read. Rule 11 was expunged. Rule 12 to read as Rule 11, 13 to be 12, 14 to be 13, passed as read.

Mr. Hards proposed, seconded by Mr. F. Ginsberg, that these rules be printed as passed at this meeting, and that copies be sent to each Association.

The Secretary explained that the meeting had been decided on that morning, and both the President and himself had no opportunity of presenting their reports in proper order. He was preparing his report and financial statement with the idea that it was to come before the June (annual) meeting.

It was resolved that the President's address, Secretary's report and financial statement be printed, together with the official report of the meeting, and that copies be sent to each Association and member of the Board.

The Chairman said that a statement of the expenditure incurred by the Board during the year 1904-05 (at the time the Department had the Board's grant) had been sent to them and it showed an unexpended balance of £33 14s.

Mr. Kruuse proposed, seconded by Mr. Ella, that the Secretary be instructed to write to the Department asking that the unexpended balance of what is understood to be an out-and-out grant to the Board, of the year 1904-05, be handed to the Board.

Mr. F. Ginsberg, M.L.A , and Sir E. Y. Brabant, M.L.A., promised to see into the matter, and it was agreed to

The Secretary read letters from the Department *re* Fruit Models, regretting no funds were available for further purchase by the Department and offering to order on behalf of the Board, and charge to the Board's grant for next financial year.

Re official report on fruit sent to the South African Products Exhibition, no report has yet reached the Department. The information required will be sent as soon as received.

Re opinion asked as to the advisability of affiliation to the Royal Horticultural Society, England, the Secretary for Agriculture does not see what benefit is likely to be derived at present from such affiliation, and considers that efforts should be directed towards organisation of the agricultural bodies in such a way as to enlarge their sphere of action in the Colony, that by means of a much larger membership they may be expressive of the needs and views of the farming community and so attain a strength and position which will enable them to exert increasing influence.—Letter recorded.

The annual Fruit Growers' Congress, King William's Town.—That a contribution towards the expenses of Congress of £5 is sanctioned by the Secretary for Agriculture, but is not available till after June 30 next. That the grant to the Board for the year 1907-08 will be paid on application as soon as the funds are voted by Parliament.

EAST LONDON EXPERIMENTAL FRUIT PLOTS AT SUMMER PRIDE AND AMALINDA.

The Secretary reported with reference to the agreements between the owners of the East London experimental fruit plots and the Colonial Government that Mr M. Tindale had signed the agreement, and it had been sent to the Department. Mr. Davies was willing to complete his agreement as soon as the plot was planted.

Details were given as to the planting and the varieties of trees, and the Secretary reported he had visited both plots and found the trees flourishing in spite of being planted practically out of season.

The Chairman said he was of opinion the Board was indebted to their energetic Secretary for the great interest he took in the matter. Had they waited for a fruit expert the plots would never have been started. Seeing the financial year was so near a close they could not do better than ask the Department for the balance of the vote so that they could bring matters to a satisfactory issue. The two plots (sub-tropical and hardy fruits) were considered as one plot and half the vote of £100 would be expended on each. It was decided that no trees as "fillers" be planted on the Summer Pride plot.

It was resolved that the Secretary write the Department asking that the balance, being £61 10s. 8d., be handed over to the Board for completing the planting of the plots, the Executive of the Board and the Committee of the East London Farmers' and Fruit Growers' Associations to have full power to act conjointly.

AUDITORS.

Messrs. F. Ginsberg and Jas. Leighton were appointed auditors, and to draw up a report.

A bonus of £25 was voted to the Secretary, on the motion of Mr. Hards, to be paid if funds are shown available. A hearty vote of thanks was accorded the Hon. Secretary for his past services.

The Board then resolved into the annual general meeting.

ELECTION OF OFFICERS.

The election of President for the ensuing year took place. Mr. Landrey nominated Mr. F. Ginsberg. Mr. Ginsberg declined the honour on the grounds of his Parliamentay duties interfering.

Mr. Landrey nominated Mr. Jas. Leighton as President, and Mr. Kruuse seconded. Mr. Leighton declined to stand.

Mr. Ginsberg nominated Mr. H. Hards, and Mr. Flanagan seconded.

Mr. Leighton nominated Mr. J. Landrey, and Mr. Goulden seconded, but Mr. Landrey declined.

It was put to the meeting and Mr. H. Hards was declared elected.

VICE-PRESIDENTS.

Mr. Hards nominated Mr. J. Leighton. Mr. Leighton said he would prefer not to take office, as he could not give the time to it that it required. Mr. Hards nominated Messrs. J. Landrey and H. G. Flanagan, seconded by Mr. P. M. Kruuse. It was put to the meeting, and Messrs. J. Landrey and H. G. Flanagan were declared duly elected Vice-Presidents.

HON. SECRETARY AND TREASURER.

Mr. Ginsberg proposed, seconded by Mr. Dugmore, that Mr. Goulden be asked to continue in office.

Mr. Goulden signified his willingness, and was declared duly elected.

EXECUTIVE COMMITTEE.

Mr. Hards proposed, seconded by Mr. Dugmore, that the President, two Vice-Presidents and the Hon. Secretary form the Executive. This was agreed to *nem. con.* This concluded the business.

* * *

PRESIDENT'S ADDRESS.

The address of the President (Mr. J. Leighton) was as follows :

As this meeting brings another year's work to a close, I will endeavour, before vacating the chair, to give a brief resumé of what has been done during my year of office. In addition to the regular meetings of our Board, several meetings of your Executive have taken place. During the year two fruit plots have been established for experimental purposes. These plots are situated near East London, and the sites selected are well adapted for the purpose for which they are intended. One of these plots is only a little above sea level, and is well sheltered, and a most likely place to suit the requirements of sub-tropical plants. The other plot is on the high ground near Summer Pride, on the railway, and proves a suitable site for hardy fruits. These sites were carefully inspected by your Executive, along with a representative of the East London Farmers' and Fruit Growers' Association. In the absence of a fruit expert the work of laying out and planting these trees was entrusted to our secretary. Sites for experimental plots were offered from two other districts, but the small grant placed at the disposal of the Agricultural Department would not admit of these being put in hand this financial year. The Board have had the rules under discussion at several of their meetings and have drawn up an amended constitution that will meet present requirements if adopted. Hitherto only matters relating to fruit growing could come under discussion, but with our new constitution everything that will further the best interests of horticulture will receive the attention of the Board. The great importance of the products exhibition recently held in London was fully recognised by the Board and a special effort was made to stimulate an interest in it among fruit growers and others. Much information of value to fruit growers has been collected and sent out to Associations. The continued representations of the Board have resulted in a depôt for the supply of guano and cyanide being established in East London. The thanks of the Board are due to the Department of Agriculture for the most considerate way in which their representations have been treated. Before retiring from office I wish to place on record the valuable service rendered by our hardworking Secretary. He has been ever ready to supply information of value to Associations and to fruit growers. To give some estimate of the great amount of work which has devolved on him, I may mention that over 1,000 letters have been written since he took office two years ago. As the Secretary will submit a most comprehensive report, I will conclude by wishing the newly-appointed Board a successful year.

SECRETARY'S REPORT.

Mr. Chairman and Gentlemen,—It is with great pleasure I have to report to you a renewed interest in horticulture, and a manifest tendency on the part of fruit growers, vine growers, nurserymen and others to move their several Societies and Associations to support the Board in the good work it has undertaken. From the list of those affiliated, but one Association has seen fit to secede, and in that particular case has gone back to its former status as a farmers' association only. On the other hand five, three of which are new societies, have now fallen into line, and it is safe to say others will do likewise after seeing the list of delegates attending this year's Congress. The executive power of your Board, after arranging as to a representative Congress, does not cease after the deliberations of that Congress, but as an Advisory Board, meeting quarterly, guides the Government as to legislation and the requirements of horticulture generally, always endeavouring to keep the interests of the Eastern Province in the forefront. Your Board has co-operated with the Western Board in a cordial and friendly spirit, and by combining in a joint Congress now for the third time, good results are anticipated, while your Board abates in no degree whatsoever its individuality. By meeting at different centres at different times it is hoped to suit the various districts in the Province, the distances many members have to travel being against well attended meetings, and it is hoped that this will be borne in mind, and that every district will see to it that it is represented on the Board. I would emphasise the fact that there is room for every phase of opinion on horticultural matters on the Board. I should like to see more Horticultural Societies existent, florist and nurserymen's associations started, and all having representation. The work that has been done, gentlemen, is little indeed compared with what will be undertaken in the near future, but considering the difficulties around you, your Board has accomplished a good deal. Your Secretary has been at the service of all who applied for information, and if cudgelling his brains did not answer, had always books of reference supplied by an agricultural Government to refer to. We have been most persistent in our demands for expert assistance, and the assurance has been given that when money is in the country we shall have all we want. At this year's Congress we are still clamouring and on the principle of all comes to him who waits, we may get our experts if we wait long enough. Some of our members sent good exhibits to the exhibition in London, but many of us were sadly remiss in this respect, including myself, and we all have good reasons, alas! The matter of fruit growers' requisites was taken up and an effort was made to show growers where their requirements could be purchased to the best advantage. A sub-tropical as well as a hardy experimental fruit plot was established in the East London district, and everything points to these being an object lesson to fruit growers in a very short time. Here new, and in some cases quite unknown, fruits will be given a trial. The public spirit shewn by the gentlemen who placed these plots at the disposal of the fruit grower, is worth noting. In keeping both eyes open in seeing the codlin moth is kept back from clean areas, the Board has been very much alive, and if at the same time all fruit growers would notify any infringement of the regulations immediately to the Secretary and to the authorities the pest may never find a good foothold. A cyanide depot, also a guano depot, was established in East London directly on the representations made to Government by the Board. The matter of the reduction of the duty on fruit boxes engaged the attention of the Board, and your Secretary feels that should Congress declare itself in favour of Protection, any expression of opinion from himself had best remain *sub mutatis mutandis*. The work the Board has before it is illimitable. Such questions as the introduction of new fruits (and here nurserymen would find it to their benefit to assist), naming of fruits, suitable stocks for fruit trees, economic plants, flowering plants, shrubs and trees, flowers grown for essential oils, drying, preserving of fruit, cultural methods, artificial manuring, remedial measures for insect pests, and a hundred and one other kindred subjects, the Board will have to consider at no very distant date. It is hoped to add to the number of the models of fruit now owned by the Board, and to be seen in the King William's Town Museum, which for the purpose of comparison are invaluable. Trusting that a widespread and greater interest may be taken in horticulture each succeeding year, I have the honour to subscribe myself,

W. B. B. GOULDEN,

Hon. Secretary,

E.P. Board of Horticulture.

FINANCIAL STATEMENT.

Cr.—

By balance in Bank, March 8, 1906	£101	18	4
,, Lounsbury testimonial	20	5	0
,, Sale fly-netting	2	12	6
,, Government grant, 1905-1906	125	0	0
,, Refund, experimental plots, East London	38	9	4
	£288	5	2

Dr.—

To Lounsbury fund	£20	5	0
,, Petty expenses, telegrams, etc., Congress, 1906	2	0	0
,, Half share report of Congress, Capetown	5	5	0
,, Printing	7	7	11
,, Fare, delegate to Komgha	0	17	0
,, Fares, delegates to Congress, Oudtshoorn, 1905	18	9	7
,, Printing and stationery	4	13	2
,, Brembridge & Co.	0	16	6
,, Bonus to Secretary, 1905-1906	25	0	0
,, Fares, Executive to East London, June 3, 1906, *re* fruit plots, cart hire	5	2	7
,, Fares, delegates to Congress, 1906	61	0	0
,, Fares, September meeting, and bonus to caretaker	1	6	4
,, Expenditure, fruit plots, East London	38	11	4
,, Fruit fly-netting	4	2	0
,, Fares, delegates to Congress, 1905, Oudtshoorn	10	7	3
,, Fares and expenses, Secretary, to King William's Town and East London on Board business	1	15	5
,, 3—25 cheque books	0	7	6
,, Petty cash, postages, telegrams, etc.	6	9	7
,, Balance in hand	74	9	0
	£288	5	2

Examined and found correct,

JAMES LEIGHTON,
F. GINSBERG.

May 15, 1907.

The Board met immediately after Congress to decide on the date and place for the next quarterly meeting.

Mr. Dugmore proposed, seconded by Mr. Landrey, that the next place of meeting be in Grahamstown.

This was agreed to.

It was resolved that the date be fixed for the third Friday in the month of September, and that a fortnight's notice be given.

An amount of £5 was placed in the Secretary's hands for disbursement of petty cash and postages.

On the motion of Mr. Hards, the outgoing President (Mr. Leighton) was accorded a hearty vote of thanks,

This was suitably replied to, and the meeting was closed.

NATIONAL WOOL AND MOHAIR GROWERS' ASSOCIATION.

OFFICIAL MINUTES OF EXECUTIVE MEETING AT CRADOCK, ON MAY 23RD, 1907.

Present:—The Hon. P. W. Michau, M.L.C., Messrs. T. T. Hoole, J. R. Jackson, W. H. Hockly, Heynes, Badenhorst and E. R. H. Hobson, Secretary, Mr. Hannon (Superintendent of Agricultural Co-operation), and Mr. McKee (Government Wool Expert), were also present.

The minutes of previous meetings were read and confirmed.

CORRESPONDENCE.

A wire was read from Mr. Colin White, regretting inability to to attend.

A letter from Mr. Daverin, stating his inability to attend owing to business engagements, was read and recorded.

CO-OPERATION.

The following letter from the City Council of Cape Town was read:—

> Sir,—The responsible committee of the Capetown Council have, for some time past, had under consideration the question of the revival of the local wool market.
>
> As doubtless you are aware, some few years ago a market building for the convenience of the farmers producing, and the merchants dealing in wool, feathers and produce generally, was erected by the Council upon the Dock Road, Cape Town, in close proximity to the docks, and with a railway siding, but, owing principally it is believed, to the fact that facilities for the proper baling and pressing of the wool were not provided on the premises, the trade has gradually gone to centres where the necessary machinery for the purpose of pressing was available.
>
> The Committee understand that there is a feeling among producers of wool that additional markets should be opened up in order to ensure that the best possible prices may be obtained for our Colonial products, and that the Council should endeavour to establish a market in the City of Capetown, to which wool could be forwarded for pressing and baling, and for sale by auction, as in a centre such as this there could be little doubt the best possible prices would be obtained.
>
> The Committee are quite prepared to recommend the Council to meet the wishes of the wool growers in the matter, provided that a fair measure of support is forthcoming, and I am directed to enquire whether, in the event of the Corporation undertaking the provision of the necessary machinery and the inauguration of wool sales in the City, the members of the Society, of which you are the Secretary, would be prepared to co-operate by sending their wool to the market, and also as to the approximate quantity produced which your members would be prepared to consign to the market for disposal.

In no case would the charges required to be levied in connection with the market and pressing operations exceed the charges obtaining in other centres in which sales are conducted

I am directed to ask that you will be good enough to bring this communication before your Society at your early convenience in order that the corporation may be favoured with the views of your members thereon.

I am Sir,

Your obedient servant,

R. Finch.

Town Clerk.

Cape Town,
8th April, 1907.

The Secretary was instructed to send a letter to the Cape Town Council acknowledging their letter, and informing them that the Executive approve of the steps that have been taken by the City Council, but as the matter was one affecting the Western Province chiefly, it was being referred to our branches in that section.

Secretary's Report.

Secretary's report was read and adopted as follows:—

Mr. President and Gentlemen,—I have to report that, as desired, I wrote to the secretaries of the various branches to instruct their representatives at this meeting of the Executive with the feeling of their members in reference to the desirability or otherwise of amalgamation with the South African Co-operative Unie.

In the matter of the Frauds in Mohair, the Port Elizabeth Produce Association promptly responded to our invitation to take up the matter, and promised to report any cases of fraudulent packing which came to their notice, and to take such steps as the circumstances would allow. I took the liberty of publishing this correspondence at once, and at the same time invited Angora goat farmers to report any cases that came to their notice In this matter alone I think the Association has justified its establishment. The Press, too, rendered valuable assistance. With reference to the illegal use of the registered brand of our Association, reported at our last meeting, Mr. Daverin has written to say the person has been traced and warned not to repeat the offence, which I understand was inadvertently done. There has been considerable enquiry on the part of the Branch Associations, members of our Executive and other well-wishers of our movement with reference to direct shipping. This has been particularly the case since our meeting with the delegates of the South African Co-operative Unie here in January. The importance of the matter has been so often urged that, after consultation with our President and some of the Executive, it was decided to call this meeting of the Executive to deal with this and other important matters. Some time ago I sent out a circular to the Secretaries of Branch Associations for the approximate number of bales of wool and mohair which members are likely to ship direct, either to London or the Continent, if conditions are favourable. At present the returns are incomplete, but I hope to have a list to supply to the Committee, if desired. Many farmers, of course, would like to know what the recommendations of this meeting are before deciding.

In connection with the matter of shipping direct, I have letters from Messrs. Buxton, Ronald & Co., of London, and Herman Exner, Esq., of Hamburg, Germany. These gentlemen have, I believe, written on their own initiation. There are no letters from firms in South Africa, perhaps because as far as I am aware, at the present no one has been invited to make any offer.

In close connection with the above is a letter from the Corporation of the City of Capetown, offering increased facilities for the sale of produce upon their local market, and also a valuable paper by Mr. G. E. Dugmore, M.L.A., dealing with the public sale of Cape wools in South Africa. Mr. Dugmore has supplied me with half-a dozen copies of his paper, which are now upon the table for the use of members.—Yours, &c.,

E. R. Hobson, *Secretary.*

AMALGAMATION WITH THE UNIE.

The Executive Council is opposed to any amalgamation with the Co-operation of the O.R.C.

DIRECT SHIPMENT.

The Chairman said the Association must take definite action if it is to go forward; he strongly condemned any policy of standing still. He (Mr. Michau) advised that a committee be formed to take the necessary steps for making some arrangements with brokers overseas and also to make provision for members who would like to sell locally.

Mr. Heynes spoke strongly in favour of direct shipment and stated that the wool buyers of this Colony, notwithstanding promises of support made at Port Elizabeth when the Association was started, had done absolutely nothing to assist them.

Mr. Hockly was in favour of sending a circular to branches similar to the one sent by the Secretary on the 1st of March, again urging upon the branches the great need of definite data.

It was resolved, "That the present method of selling wool and mohair by private contract is prejudicial to the wool and mohair buyers and sellers alike, and the Council urges the desirability of establishing periodic public sales, where the clips of individual farmers should be sold on their merits.

"A Committee of five members to be appointed to enquire into and make suggestions to carry out the above resolution, viz., to arrange for the sale of produce in the Colony, and further to recommend the best means to ship and sell in European markets."

COMMITTEE ON THE DISPOSAL OF PRODUCE.

The following committee was appointed: Messrs. Michau, Heynes, Jackson, Hoole, Hockly and E. R. Hobson (Secretary and Convener).—Carried.

NATIONAL BRAND.

The Council, while recognizing the importance of having the National Brand attached to their bales are of opinion that it cannot now be introduced, but urges that every effort should be made to make provision for it being used on the 1908 clip.

OSTRICH FEATHER THEFTS.

"The Executive Council of the National Association of Wool, Mohair and Feather Growers recognises with regret that the system of buying ostrich feathers in the Colony is still eminently unsatisfactory, and urges the necessity of farmers disposing of their feathers through the recognised firms concerned with this industry. Moreover, it is of opinion that the provisions of the draft bill now published are not sufficiently strong to meet the present objections, and suggests that a Select Committee of Parliament be appointed early in the next session to consider this vital subject in conjunction with the proposed bill."

The sub-committee appointed to deal with improved methods for the disposal of wool and mohair met immediately after the close of the Executive meeting.

APPLICATIONS FOR AGRICULTURAL EMPLOYMENT.

A. L. F. Driscoll, "Post Restante, Cape Town."—Wants employment as Gardener. Age 32, Married, wife and three children. Will work any part Colony, Understands Fruit Culture. Has farmed in Eastern Province (arable farming)

ORANGES, NARTJES & LEMON TREES.

A large variety of choice selections from the leading Orange Countries, as well as the best this Colony produces. Prices from nursery rows 2/6 to 3/-, and for large established Trees in tins 3/7 to 4/3, according to quantity.

WRITE FOR CATALOGUES.

H. MEYERS,

Citrus Nurseryman, SIMONDIUM, C.C.

THE PROPOSED AGRICULTURAL CREDIT SYSTEM.

We have been requested, by the writer, to publish the following copy of a letter forwarded to the Hon. the Treasurer:—

THE HON. THE TREASURER OF THE CAPE COLONY.

Sir,—I have duly received the Pamphlet dealing with the proposed agricultural credit system for this Colony.

Nothing, in my opinion, can be brought before the Legislature of this Colony which will be more beneficial to the welfare of the Colony and the farmers generally. If it is admitted that the farmers should be the backbone of South Africa, then no steps should be delayed in making the farming industry successful and prosperous, and without some capital this cannot be done.

I am speaking from personal experience for the last 33 years, having commenced farming in this District in 1873.

Many young and middle-aged men who intended to settle on the land have been obliged to give it up for the want of a little capital to keep the pot boiling.

To apply to the Banks or local Companies in Kimberley was useless, as loans to farmers were always treated with the greatest indifference, whereas anything in the shape of mining or advances against mining shares, was always supported by the Banks, which were in the habit of making advances on these securities.

The loan companies in Kimberley up to now will not advance money to farmers on first mortgage under 8 per cent. per annum. The borrower has also to pay £6 odd for registration of Bond, plus 5 per cent. to the agent for raising the loan. Even at this rate it is most difficult to obtain small loans or assistance for the small man on the land, and I take it these are the men who live on the land and make it habitable, and should therefore have every assistance and encouragement.

At what rate should interest be charged? I think the Government should charge 1 per cent. over and above the rate paid for the loan, *not* to exceed 4½ per cent., which with 1 per cent. proposed to be charged to the borrowers, ought to pay the charges of administration.

Farmers should have the option of borrowing on the lines of a sinking fund or without.

Quitrents.—To assist the farming interests in Griqualand West and British Becchuanaland the high quitrents should be reduced to the level of £1 per 1,000 morgen. I know of high quitrent farms which have been unoccupied and unsaleable for the last 20 years. The Government has had the full value of these farms by quitrents paid, and should therefore reduce without hesitation and let these farms be occupied.

Fencing and building material should be carried free over the Railways as long as the same are used for the improvement of farms. This is done in Australia and New Zealand, and why not here ?

How to bring Farmers in Touch with the Markets.—The Government ought to take over all existing main roads and construct others which are urgently required.

One ought to be constructed through the centre of this District to Kuruman.

The Divisional Council Act requires amendment to enable each Ward to have the spending of the rate it pays upon its roads, *and no improvements ought ever to be taxed.* As matters stand now this Ward has paid road rates for more than 20 years, and not a brass farthing has ever been expended on its roads. Is this fair or just ?

A Railway Necessary.—A railway should also be constructed from Kimberley to Kuruman, to enable farmers to convey their produce and livestock to market, the nearest being Kimberley. That a railway to Kuruman would tend to open up and develop the district of Barkly West, as well as the Kuruman district—which includes the Langberg—there can be no shadow of doubt. Farming a long way from a railway is up-hill work, and if these districts are to have a fair chance, let the Government construct a line to Kuruman from either Kimberley or Fourteen Streams. One from Fourteen Streams would give the farmers a choice of either a Johannesburg or a Kimberley market. The one from Kimberley *via* Barkly West, would have the effect of opening up the Barkly division, supplying the district mines with fuel, etc., and establishing townships along the river.

Will it pay Expenses ?—If a couple of trains are run weekly, I have no doubt in the near future it would. There is a large Native population in the division of Kuruman, who would use the train in going to and from the mines. This kind of traffic, I have been informed, pays well.

Any quantity of Vaalbush.—On the Kaap Range is a sea of Vaalbush, which kind of fuel is largely used in Kimberley, and which could be collected and sent in by rail. This fuel would feed the railway for years.

The eradication, to a certain extent, of the Vaalbush would improve the grazing qualities of the Range, as it covers quite a half the veld, and when it grows to ten or twelve feet high, it becomes coarse, and stock does not care for it. When dug out by the roots tender succulent plants come out and sweet grass starts to grow where none grew before, thus providing additional grazing for merino sheep and ostriches.

The Kaap Range is an excellent piece of country for all kinds of sheep, including the Merino, which now predominates.

Irrigation, &c.—Then again a small irrigation scheme can be carried out at Kuruman, which would ensure some 15 or 20 miles of the Kuruman River Valley, being irrigated, the cereals from which, could be railed to Kimberley, if not required on the spot.

The land beyond Kuruman as far as the Molopo River, would become inhabited and large stock runs would soon be established as the railway would enable those investing capital in stock, &c., to convey the same to market.

In New Zealand and Australia, railways are built to bring the people on to the land. In this country the people are expected to go into a wilderness, and produce sufficient to make a railway pay before it is built, which is the real cause of this Colony, being a hundred years behind Canada, Australia, and New Zealand.

What was the first idea of the late C. J. Rhodes in regard to Rhodesia?

To build a railway to Bulawayo in order to take people there and to supply their wants—and if he had adopted the ox-wagon mode of taking settlers into that country, would it to-day be a land in the occupation of Europeans?

I venture to say, it would have reverted back to a native state.

Let us apply some of his wisdom to the development of our little hinterland, which has great capabilities in the way of gold, asbestos, fuel, and last, but not least, agricultural and pastoral farming.

I have, &c.,

GERALD DONOVAN.

Blikfontein, 15th April.

WESTERN PROVINCE AGRICULTURAL SOCIETY'S EGG LAYING COMPETITION.

Record of Eggs laid from 18th June, 1906, to 31st May, 1907.

Pen No.	Breed.	Pullet No.	Eggs laid April & May		Total per Pen to 31st May.	
			No.	Points.	No.	Points.
1	Buff Orpingtons ..	1*				
		2				
		3	1	1		
		4	2	4	379	724
2	Partridge Wyandottes	5				
		6	8	12		
		7				
		8	8	16	318	585
3	White Wyandottes ..	9	6	12		
		10	14	28		
		11	33	66		
		12	37	73	658	1268
4	White Leghorns ..	13				
		14				
		15				
		16	22	44	637	1083
5	White Wyandottes ..	17	17	33		
		18				
		19	11	22		
		20			474	865
6	Buff Orpingtons ..	21	14	28		
		22*				
		23				
		24	16	32	408	809
7	Plymouth Rocks ..	25	19	37		
		26	10	10		
		27	4	8		
		28	24	41	552	892
8	Buff Orpingtons ..	29	10	18		
		30	6	12		
		31	25	50		
		32	3	5	451	840
9	Brown Leghorns ..	33				
		34*				
		35	15	30		
		36	4	8	452	873
10	Buff Orpingtons ..	37	29	57		
		38	28	56		
		39	5	10		
		40	28	56	546	1049
11	White Leghorns ..	41				
		42				
		43	21	40		
		44			435	851
12	Buff Leghorns ..	45*				
		46	21	42		
		47	2			
		48*			385	719

*Dead.

Western Province Agricultural Society's Egg Laying Competition—*continued.*

Pen. No.	Breed.	Pullet No.	Eggs laid April & May.		Total per Pen to 31st May.	
			No.	Points.	No.	Points.
13	Buff Orpingtons ..	49*				
		50	8	16		
		51	18	36		
		52	13	26	471	907
14	Buff Orpingtons ..	53	6	12		
		54	18	35		
		55	2	3		
		56	10	20	502	921
15	White Wyandottes ..	57	20	34		
		58	10	20		
		59	3	6		
		60*			373	624
16	Black Orpingtons ..	61	17	34		
		62				
		63*				
		64			415	826
17	Buff Orpingtons ..	65	10	20		
		66				
		67	9	9		
		68	26	51	430	731
18	White Leghorns ..	69				
		70	14	28		
		71				
		72*			475	915
19	Brown Leghorns ..	73	5	10		
		74				
		75				
		76			504	874
20	White Leghorns ..	77	12	24		
		78	31	62		
		79*				
		80*			415	804
21	White Leghorns ..	81				
		82				
		83				
		84			254	488
22	Buff Orpingtons ..	85	9	18		
		86				
		87	16	27		
		88			436	746
23	Buff Orpingtons ..	89	11	21		
		90	13	26		
		91				
		92			483	886
24	Plymouth Rocks ..	93	26	41		
		94*				
		95	26	39		
		96			404	601

In scoring, 2 points are given for every egg weighing over 1¾ ounces, and 1 point for every egg weighing 1¾ ounces or less

* Dead.

CORRESPONDENCE.

Correspondence and contributions are invited on all subjects affecting the Farming Industries of South Africa, suggestions for consideration or hints as to improved methods being particularly welcome.

Questions are also invited. In this department, every endeavour will be made to procure the desired information for publication in the next issue, but this cannot be guaranteed in the case of letters received after the 20th of the month. Should a correspondent deem his enquiry urgent, he should say so, and an answer will be returned *through the post* as soon as possible.

All letters or contributions should be plainly addressed: "The Editor of the *Agricultural Journal*, Department of Agriculture, Capetown;" they should be written on one side of the paper only, and be accompanied by the name and postal address of the writer, not necessarily for publication, but as a guarantee of good faith A *nom de plume* may be attached for publication.

Show Wines and Analysis.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the January issue of the *Agricultural Journal* you publish the results of the analyses of the samples of wine which took prizes at the Board of Horticulture's Wine Show, held on 24th October last.

As some of the wines show an unduly high proportion of volatile acid and other undesirable ingredients, it is only fair to the prize winners to point out that a serious delay appears to have taken place in making the analyses. The wines were forwarded to the Analytical Laboratory on the 25th October, while the report is dated 28th December; and it is understood that, while waiting for analyses the samples were lying in the Laboratory, which is hardly a suitable place to store young wine, and it is evident that this treatment was responsible for the deterioration of some of the samples, as it has been ascertained that one of the wines which showed the worst analysis was delivered to one of the Cape Town wine merchants, about the time the report was issued, in a perfectly sound condition.

Under these circumstances it was decided, at the last meeting of the Board of Horticulture, that the results, as published, could hardly be taken as a true criterion of the merits of the various samples, and it was resolved to pay out the prizes in accordance with the judges' awards.—Yours, etc.,

A. A. PERSSE,

Secretary,

W.P. Horticultural Board.

The senior analyst explains that the delay was unavoidable as other more pressing work called away the only analyst he has available for this work.

Lamziekte.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Myself and other farmers on the Kaap Range are anxiously waiting to hear what the results are of the investigations which Mr. Spreull is making at the experimental station.

The question to be settled is in a nutshell, *viz.*, Is lamziekte *pasteurella* or not? Once this point is settled the next is, What remedy is there for the disease?

During the summer months I have had eight or ten cases on this farm, and all the symptoms are similar to those described by Mr. Bowhill in the *Agricultural Journal.*

Cattle which have had the disease are liable to get it twice or thrice, but always die after the third attack, clearly demonstrating the fact that they do not *salt.*

Has the Agricultural Department made any enquiries in other countries where *Pasteurella bovis* exists with a view of finding out if there is any remedy? I have been informed that a similar disease exists in India, America, and the Argentine Republic.—Yours, etc.,

GERALD DONOVAN.

Barkly West, May 20, 1907.

So soon as the investigations now being carried out are completed, details will be published. On the result of these will depend the decision as to what further steps should be taken.—Ed., *Agricultural Journal.*

The Southern Ostrich.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the March issue of the *Agricultural Journal* I read the report of Mr. F. W. FitzSimons, F.Z.S., etc., on the Southern Ostrich, and was surprised to find no mention of this bird in this district.

At present I think there are 1,000 of these wild ostriches in the districts of Barkly West and Herbert north of the Vaal River; and not less than 1,000 chicks are caught annually and sold to buyers from the Colony, Transvaal, Orange River Colony, and Vryburg District.

In the Kuruman and Gordonia Districts are many birds roving over the veld, which ought to be protected and preserved in the interests of ostrich farmers of the future.

If the Government will place farmers in a position to fence their land properly, ostrich farming will become one of the great industries in these northern portions of the Colony.

Before the war I had 300 birds on this farm, and when I returned here in August, 1902, only forty remained.

With this number and some chicks caught last season, I am continuing ostrich farming, and hope in a couple of years to have 500 properly camped.

Not having had a camp, the birds have been herded by two natives, and kraaled at night, and in spite of this treatment they have thrived, but none have paired in consequence.

This season I have a camp ready, and have placed them in it. I, therefore, expect several to pair and lay this year.

If ostrich farmers in the old Colony require new blood in the shape of chicks of the wild birds, they can send their orders to me, and I shall get them as many as are required.

Since the war a great many beautiful cock birds have been shot, and this evil practice still continues. Under the present Act the Police find it most difficult to bring the crime home to the culprits.

The persons who are suspected of these illegal acts are well known to the Police, and the buyers of the feathers also, but unless caught in the act or by the use of detectives, little or nothing can be done.

Not long ago there was a rumour that a well known fieldcornet, a Scab inspector, a farmer and a Cape Policeman were all implicated in some form or other *re* ostrich and royal game shooting, and some excitement was looked forward to, but the thing has died a natural death. I think, however, the matter should be thoroughly investigated, in the interests of those whose names have been associated with the rumour referred to.—Yours, etc.,

GERALD DONOVAN.

Blikfontein, Barkly West, May 19, 1907.

Bare Fallows.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—On the above subject, mentioned by Mr. E. Goldsmith this month, I would like to caution young farmers, at any rate, against following out too closely the advice given. Old farmers know better. In the Eastern Province, especially along the coast, where the land is usually light, why they would have no land left to plough, for it would all be blown away. As an old English farmer I have seen land there benefited by fallowing, but I reckon it is a wasteful business all the same, and that it would be better policy, therefore better farming, to keep it in crop, and if no use can be made of the crop otherwise, then plough it in, and thus manure your land cheaply. I will go further, though to Mr. Goldsmith it will seem heresy, when I say that to fallow, as he suggests, *viz.,* to keep down all plant life by ploughing four or five times during a summer, I say his soil would become barren through the sun's action on the soil. I have tried it, and speak from experience. Again and again I have been beaten by farmers here with root crops when I followed the fallowing system, and they continuously cropped and ploughed in the weeds two feet high on the same soil practically.—Yours, etc.,

J. RUSHFORTH.

Strathsomers Estate, Bayville, May 21, 1907.

The Divining Rod not a Fraud.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Having seen in your May issue of the *Journal* the copied letter from the *Rapid Review,* I venture, or try, to give my experience as a water finder by the aid of the divining rod. I consider this method of discovering underground springs only in its infancy. The twisting of the rod and vibration which so many people can manage to cause the rod to work does not indicate that it shows water in that certain spot or locality. Severe pressure with a certain twist will cause the rod to vibrate, and inexperienced water finders then run away with the idea that they can show water because the rod works with them. Hence the number of failures to find the supposed water, and the principle is then put down as a fraud. Anyone who can work the divining rod with skill, and especially with a true, honest feeling that he has selected the right spot, which should be the centre of the stream or spring which is to be bored for. The diviner should be able to tell which way the water is flowing underground, should be able to tell if the flow is weak or if it is strong. Then he should be able to find some definite and distinct signs if he is up to date. These found, he can prove to himself if his mark is correct. I believe very few diviners have come to that standard, and if they have, they are then in a position to locate underground streams almost without failure. The question of depth would handicap them, as I have failed to find any definite sign which may be relied upon. The cause of the peculiar working of the divining rod is almost unexplainable by words, and the nearest explanation I can give is that the rod works something like a magnet that will draw a needle. In the same way will the diviner feel the underground spring. The forked stick of any kind, if pliable, is only a tool to work with. For instance, every tradesman must have his tools to work with. I have marked out twenty-two sites for drilling, which are completed, and all of these boreholes are giving permanent water, varying from 80,000 gallons to 1,800, being the highest and lowest yields. I have dozens waiting for drills, and to-day have six drills boring on sites marked by me. As to depths, I have found very unsatisfactory results, owing, so far, that I can find no definite sign to start a correct measurement. I have been right in depths and also quite wrong, which I attribute to differences of locality, different formations, and the width of the streams vary so. The old scientific theory of catchment water is to a great extent upset by my new discoveries. I have found splendid underground streams which are giving water to-day, and have no catchment at all, one being on the top of a small hill or rise at a depth of only seventy-four feet. I have been so successful and feel so confident of my theory that I would be prepared to stand a trial test by anyone who wished so to do, whether private individual or Government. That is, for example, I would make or select three sites for boring which will give water, and three holes which will give no water, all to be in the same locality, or less if desired, purely as a test of my new discoveries, all worked or assisted by the divining rod. And still one more point which I have proved—I can give the names of the farms and owners where these boreholes are—and that is I am able to tell before boring starts if only one stream of water will be struck or more. I have found one, two, and three, all running parallel with each other, and can be tapped by one borehole. The rod does not show or work with me on any kind of mineral or stagnant water, but will work only on running, underground streams. Trusting you will publish this in your *Journal*, and I hope that I have not taken up too much of your valuable space.—Yours, etc.,

B. M. Bowker, F.C.

Olive Fountain, P.O., Bedford.

Banana Fibre from East Africa.

To the Editor, Agricultural Journal.

Sir,—Mr. J. A. Willet, a well known Port Elizabeth resident, has just recently returned from a trip to British East Africa, and has handed me some very excellent fibre prepared from a species of banana, which is indigenous to that part of Africa. According to a leaflet, issued by the Department of Agriculture at Nairobi, the fibre has been declared by experts to be of first-class quality and length, and the value, quoted by the Imperial Institute authorities, is from £34 to £50 per ton, which is distinctly encouraging. It might, under the circumstances, be advantageous to the Colony to endeavour to introduce this banana.—Yours, etc.,

F. W. FitzSimons.

Port Elizabeth, April 22, 1907.

Lime and Sulphur, and Wool.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—A small space in your *Journal* will greatly oblige. I am desirous of bringing to the notice of sheep farmers that they must not run away with the idea that lime and sulphur are so ruinous to wool as they are made out to be. Just to prove to them the contrary, I sent Messrs. Cooper and Nephews a sample of wool in order to get their opinion as to the quality and what dip had been used, and to my great delight their reply was that the wool was very good and sound, and if the clip was like the sample it was worth 7½d. per lb. I at once replied. and gave my reason for what I had done, which was that they had repeatedly got our very best dip condemned. Yes, sir, if lime and sulphur had been made compulsory twenty-five years ago, when the Act was put in force, we would have been rid of Scab long years ago. Cooper and Nephews little knew that the wool I sent them had been dipped in lime and sulphur twice at four months' and again twice at six months' growth, then shorn when at eight months' growth, and then sold on the Port Elizabeth market, realizing 6½d. per lb. Mr. J. Lamb sold the wool, and I wrote and got him to obtain the opinions of the merchants, and they all said the wool was good and sound, and all they could trace in the same was the smell of sulphur.

If our worthy members of Parliament would insist on making lime and sulphur compulsory, it would be most gratifying to many of us.—Yours, etc.,

S. H. PROBART.

Poortje, Aberdeen Road.

Cures for Snake Bite.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I daresay every farmer 'ere this is acquainted with the permanganate of potash cure for snake bite. This remedy, however, has its drawbacks, for, to be effective, it must be applied to the scarified wound almost immediately after being bitten, as its effect is to neutralize the poison of the snake in and about the wound.

I have lately been reading a good deal about the efficacy of ipecacuanha powder in the cure of snake bite. It is administered internally, and the wound is well scarified and poulticed with it as well. The following is an extract from the *English Mechanic*: "Shortly after my arrival in South Africa, I became acquainted with a German surgeon who cured every patient, no matter by what snake bitten, by a simple poultice of ipecacuanha powder damped with water (or human saliva on occasion), giving a little of the powder internally. He always carried a small tin of it in his pocket. He assured me he had never lost a case since administering it. I am aware that it is a common remedy in India, and used as an external application to the bites of centipedes, scorpions and other venomous pests. I can safely recommend it as the most assuaging form of application I know. Ipecac. powder in two or three minutes seems to quench the inward fire and rapidly soothe the inward inflammation." The ordinary method of using this ipecac. powder is to mix a teaspoonful in a little cold water; then cut into the site of the bite, scarifying it in three or four places immediately over the punctures, and apply the ipecac. paste as a poultice. This should be followed by about thirty grains in a wineglassful of water as an emetic. If necessary repeat in half an hour.

Personally I have had no experience whatsoever with ipecac., and would much prefer to introduce the permanganate of potash first into the scarified wounds, then apply the ipecac. poultice afterwards. It is difficult to judge of the efficacy of any supposed cure unless exhaustively tested by scientific men, as a fairly large percentage of the people bitten by snakes would have been none the worse had they applied no antidote, for the simple reason that the snakes were non-poisonous varieties.—Yours, etc.,

F. W. FitzSimons.

Port Elizabeth, April 22, 1907.

Water Drills and Water Boring.

To the Editor, Agricultural Journal.

Sir,—A letter appeared in your issue for the month of April last under the above heading, to which I consider it my duty to respond.

I do not think that the Government are influenced by the correspondence that appeared in the *Agricultural Journal* a few years ago to withdraw the diamond drills in favour of the percussion drills.

If Mr. Wayland will only go to the trouble of making enquiries he will find that the Government are quite willing to do the boring for farmers with diamond drills.

The farmers themselves very much prefer the superior work done by the contractors with the percussion drills, doing six-inch holes to the diamond drills' 3⅛-inch hole. When a good supply of water is struck with the percussion drill not flowing on the surface, it gives the farmer an opportunity of erecting a suitable pump to get the full value of the supply that the borehole yields. With the smaller holes, such as have been put down by the diamond drills, the supply must flow on the surface to be of any use to the farmer. The next question is that of boring to enormous depths in order to strike an artesian supply. I may state that the percussion drill will be found to be by far the most suitable for this class of boring. The builders of percussion drills increase the size and power of their machines in proportion to the depth that the purchasers expect to have to bore. We also have the price list showing that the cost of the machine also depends on its capacity.

There is little doubt but that it is quite possible to do thousands of feet in depth in this country, as well as any other, but I do not feel quite so sanguine that rivers of water would be got to flow from them. As to the price of boring, I would remind the correspondent that the spaces in the contract form are left blank to enable the farmer to make his own terms with the contractor. In this district I find most of the farmers ready to cut the price down as much as possible. I do not know of a single case where the maximum charge of 16s. per foot has been made..

I have the satisfaction of knowing that although I have not always struck water I can bring numerous farmers who will testify to the fact that they have benefited largely according to their outlay. It is a common occurrence for me to hear this pleasing remark: "If you had not bored for me I should have had to trek." I am surprised at Mr. Wayland saying percussion drills only scratch on the surface. It stands to reason that if they did not work properly there would be no sale for them in this country.

I have been drilling for a considerable time with a percussion drill, the class of which over 200 have been sold in this country. I think that this will be quite sufficient proof of their popularity.—Yours, etc.,

W. Huddy,
Water Boring Contractor.

Molteno, May 23, 1907.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In the April issue of your *Journal* there is a letter by a Mr. Wayland on "Water Drills and Boring for Water," in which he most strongly deprecates the use of and the subsidising by Government of the percussion drill. There are several kinds of the percussion drill, and perhaps Mr. Wayland has, unfortunately, come across one of the worst, but I think he is rather rash in expressing such a decided opinion, because, as he says, he has only a limited experience of boring for water. Government, after many years of exhaustive trials, has rejected the diamond drill in favour of the percussion drill, undoubtedly on account of the latter machine having proved the more useful.

My experience during a considerable time with a number of boreholes has shown me that the percussion drill works as well through hard rock formation, makes a larger hole (from six to nine inches) than many, if not all, diamond drills in South Africa, and that the trouble and expenses in working it are far less than in the case of the diamond drill.

On a farm where formerly the work with a Government diamond drill had to be stopped, we worked easily through the rock at the average rate of three feet per diem by means of an Austin percussion drill—a clear proof, therefore, that the machine tried by Mr. Wayland was none of the best, or was badly constructed.

The sharpening of the bits is also a matter of importance.

Here in South Africa, therefore, where for ordinary irrigation purposes a maximum depth of 500 feet is sufficient to get an adequate amount of water, the percussion drill is by far the best.

True, by employing the diamond drill, one supports the diamond industry, or, rather, the diamond companies, but that is about all, as Mr. Wayland will soon find out when he has acquired some more knowledge about water drills and boring for water.

Thanking you in anticipation.—Yours, etc.,

TOBIAS J. MOSTERT, JUNR.

Philadelphia, May 18, 1907.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—In your *Journal* of April, 1907, I noticed a letter written by Mr. W. H. Wayland regarding water drills and water boring, also comparing the jumper drill and the diamond drill, in which he states that the jumper drill is not capable of penetrating hard formation. I may inform you that he is wrong. I have been drilling for the last ten years both with diamond and jumper drills, and most certainly give the jumper the preference for cutting hard formation. I have drilled with a jumper through dolerite and highly indurated sandstone, and have also seen holes drilled to over a thousand feet, *viz.*, one at Bedford Railway Station. I am sure that was not all "soft formation," or "scraping the surface," as your correspondent terms it. The main thing on a jumper drill is a capable foreman to work it. I am at present on a 6-inch hole down over 200 feet in hard formation (and mean to continue). Contractors' pockets are not so easily filled as Mr. Wayland states, speaking for those working in hard formation and completing their work. Taking a 6-inch jumper and a 6-inch diamond drill, I will do more work with the jumper.—Yours, etc.,

EXPERIENCED DRILLER.

Carlisle Bridge, May 15, 1907.

Horse Sickness.

To the Editor, Agricultural Journal.

Sir,—Kindly grant me a small space in your *Journal*. In your issue for Apri last Mr. P. N. Walker deals with the question of horse-sickness attributing it to the bite of some unknown fly. But how does he explain the discharge of gall from nostrils and mouth immediately after the animal has succumbed? As a preventive both for bots and horse-sickness many people about here have used the following mixture, viz.:—Half a botttle of a strong decoction of garlic, two tablespoonfuls of aloes and one tea poonful of turpentine thoroughly mixed. Dose a full-grown horse with half a bottle but give less to young animals. Horses in poor condition will pick up very soon by this treatment.

Yours, etc.,

A. R. Van der Walt.

Vlakfontein, Dist. Aberdeen,
May 31st, 1907.

The Classification of Sheep at Shows.

To the Editor, Agricultural Journal.

Sir,—In the January number of your *Journal*, the Hon. W. H. Rogers, M.L C., in writing on this subject, suggests reform of the present unsatisfactory method of classing sheep at shows. Mr. Rogers remarks: "If Agricultural Societies had supported sheep breeders by establishing, at shows, a system of competition for breeds of sheep, this Colony would have to-day been exporting some of the choicest animals, in the sheep line, that were ever produced in the world." In this everyone must agree with Mr. Rogers, that the time has now come, when this present system of classing sheep at shows, should be seriously considered by Agricultural Societies with the object to improve upon it. Year after year, it becomes more clearly apparent, that sheep, as being the premier industry of South Africa, should be allowed to compete against each other at shows, breed against breed. Not only do I urge this for the encouragement of sheep breeders who boast of breeding sheep of a fixed type, but more especially, that a check be put to prevent the increasing mania for inter-breeding. In fact, according to the present system of classification of sheep, it may readily be supposed that Agricultural Societies were working with the fixed intention to encourage the breeding of mongrels.

How many sheep of one or other particular breed are awarded prizes at the large shows? This would be a difficult question to answer, but it is sufficiently unsatisfactory to note that some important sheep breeders carry off prizes in the fine and robust types at shows, and at the same time choose those fine and robust sheep from *one* flock.

Now, I would by no means like to insinuate that such sheep are not worthy of the prizes gained by them, but the question must be asked, whether fine and robust wooled sheep, originating from *one* flock, can be considered as being pure bred?

However, the most serious consequences from such sheep taking the lead at shows, are that the rams are bought by various sheep breeders, who make the discovery, too late, that these pure rams do not throw true to type. The consequence is that many really pure flocks of sheep are contaminated with this mixture of blood.

Again, it must surely be granted, that if none of the four types, namely; Vermont, Rambouillet, Tasmanian, or Australian, will thrive in certain parts of this country, then certainly no other concoction, formed by the inter-breeding of these will thrive better.

In the course of a much appreciated speech, made by Mr. Maasdorp M.L.A. at the Zwart Ruggens Farmers' Association, that gentleman congratulated the Angora goat breeders on the rapid progress made in breeding such a high class animal, but regretted that sheep had of late made no progress.

To a certain extent, this deplorable fact may be attributed to the everlasting "keeping up your name" by importing expensive rams from Australia by sheep breeders, but the real root of the evil is that owing to our method of judging sheep as fine and robust, farmers have no inducement to breed a certain type of sheep, but are continually crossing, merely to obtain an animal calculated to take prizes at the large shows.

Yours, etc.,

"INTERESTED."

Diarrhœa in a Horse.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—I will be very much obliged if you can send me a remedy in your *Journal* for the below mentioned case. A cart horse is fed on dry lucerne, good cornchaff, and mealies, and occasionally mangles. When he starts on a short journey, (two hours) he is all right but after being driven a little while he begins to purge very badly. Can you kindly let me know through the pages of your valuable *Journal* an effective remedy for stopping him from purging when driven.

Yours, etc.,

TIMELY.

Winter Hoek, May 7.

Cases of this kind point to the probability of the affection having become constitutional and consequently difficult to cope with. The Veterinary Branch recommends tonics, and the following is suggested; 4 ozs gentian, 4 ozs. bi-carbonate of soda, and 4 ozs. common salt. Mix dry and give a heaped tablespoonful every night in a dry feed. Another point to bear in mind is never to give the animal water until a considerable time after feeding.

Woolly Aphis or Apple Blight.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Seeing "Rokeby's" trouble re "Woolly Aphis in his Apple Trees," I may state I had the same trouble five years ago. I bored a hole very slanting in each tree to the pith, filled the hole with paraffine and washed the stem with the same, then I plugged each hole with an Apple plug and for five years my Trees have been bearing splendid Apples. Only this season I noticed one tree with a few Woolly Aphis on; so I shall repeat the same dose to them in August. Hole bored ⅜ inch. and very slanting and low near the ground.

Yours, etc.,

F.H.

Rietfontein, May 23.

The Teachings of Experience.

To the Editor, AGRICULTURAL JOURNAL.

SIR,—Having arrived at the alloted age of man, and having been a farmer all my life I will venture to give my fellow-farmers through your valuable *Journal* some of my practical experience in stock farming.

First, and foremost of all is the salting of stock.

Every animal from man down to the smallest bird must have salt and will have it. When I first started farming, salt was a serious item, transport having been as high as £1 per 100 lbs. from Port Elizabeth to Graaff-Reinet so you can fancy what a bag of salt cost. Nine people out of ten would not give their stock salt on account of the cost, they trusted to brak ground or some other rubbish. I mixed salt with ground to try and make it spin out and found that would not do; the ground got tramped down so hard that it wore the teeth of the sheep. So I thought of another plan which was *most* successful. I took a bucket of salt and added 120 gallons of water to it. With that salt water I made *clay* out of *ash* (any ash will do) and beat it up into mounds and put it at a convenient place for the sheep to get at every day. The result was most satisfactory. I have been thanked over and over again for this receipt. All animals will eat it, cattle, horses, etc. This applies to grass veld.

Horse Sickness.—We know that this disease is infectious as well as an epidemic, so do not put a horse in an infected stable. In all diseases prevention is better than cure. Kraal your horses at night and do not let them out to feed till the dew is off the grass and never give them food in an open kraal unless you use a nose bag.

Lung-sickness in Cattle.—Inoculate to prevent infection, and take care that you have no bones from cattle that have died from Lungsickness lying about your farm. If so, the disease will always be breaking out, as cattle in the grass veld will eat bones. I had ocular demonstration of this, but our late friend, dear old Dr. Hutcheon, did not agree with me in this. Still it is so. Burn the bones and there will be no Lungsickness in the Karoo unless a sick animal infects you.

Fever in Sheep.—We have lost 12 per cent. of our young rams this season. All our sheep in the jackal proof camp, which run night and day, have been free. The camp is rather elevated, the tops of the hills are the safest places to have your sheep in the fever season.

Nenta in Goats.—Clear the Nenta bush off your farm; it only grows in certain parts.

Yours, etc.,

W. E. Murray.

Roodebloom, Graaff-Reinet.

Failure of Peaches, etc,

To the Editor, Agricultural Journal.

Sir,—Could you inform me in your issue for June what the cause is that my Peach and Apricot trees after a three years' vigorous growth and bearing remarkably well, get their tops and leaves yellow and rusty, their bark dry and hard, while the tops die off next year and after one or two years the whole tree is destroyed.

Some of my peaches and apricots were in full bloom last September and have since been in good bearing, but in November the fruit began dropping off and now one half of trees are quite dead and the other half are in good condition and full of leaves.

The same thing happened to my grafted fruit-trees and almonds. By September they began to grow well, but in November the leaves assumed a yellow tint and they are now all dead, except some which have grown to a height of 4 feet.

In looking for the cause of the mischief in the roots I find that their extremities are quite dead.

Kindly let me know also whether Peaches and Apricots may be grafted on to Almonds and if good fruit will be the result.

Yours, etc.,

C. F. Vermeulen.

Drielingspan, District Prieska, May 23.

The symptoms described are indicative of unscientific culture aided by the over generous use of irrigation water and absence of any effective system of sub-drainage of the land upon which the trees are standing. I can formulate no other reason for the dying back of the trees as stated by him. It would be interesting to know the character of the soil upon which the trees are planted and the situation of the land, whether a level or a slope, also what opportunities this correspondent has for irrigating his orchard and how often he runs the water on to the land.—E.P.

RURAL REPORTS.

Albert, May 15.—Weather very cold, after such heavy rains as have not been experienced for years past, and frosts have already been experienced. The veld is good considering the large swarms of locusts which have been here. Stock generally doing fairly well.

Bedford, May 1.—After heavy rains well above the average we are having an excellent autumn, showery, with sunshine. With good, calving in the past and the season soon to start again, dairying is in full swing and doing well. Slaughter stock plentiful and good. Sheep have been suffering with fever, but with the approach of winter that is now abating. The season is too wet for ostriches, the chicks dying off in large proportions. This has been a record season for this district with lucerne; fruit generally has done badly.

East London, May 6.—With favourable weather conditions the state of the veld is excellent. The mealie crops are not so good, as they have been damaged by the wet, and the kafir corn crop is below the average. Citrus fruits are doing well. Cattle in fair condition. Slaughter stock in demand.

Fort Beaufort, May 16.—The veld is in very good condition and the weather is variable. Cereals being sown. Mealies are showing irregular crops owing to the damage being done by the stalk borer and locusts. Cattle seem to be doing well, the calving season is good and dairying in full progress with slaughter stock plentiful. The general condition of the sheep is fair; lambing has started on most farms but it is feared the lambing will not be so good as last season owing to the damage done by fever. Slaughter sheep are plentiful and ostriches are healthy.

Hay, May 2.—With the heavy rains the veld is keeping fairly good. Grass is scarce in some parts owing to frosts and locusts, but the bushveld is good. Mealies have also suffered from locusts. Cattle are doing well, and some good slaughter stock are available. Horse sickness is reported in several places. Sheep and goats are doing well, with slaughter stock in prime condition. Ostriches are also thriving.

Herschell, May 9.—Very heavy rains have fallen, and the condition of the veld would be excellent, but it has suffered severely from locusts. Wheat is now being sown; late crops of oats are being reaped in some parts. The mealie crop now being harvested is promising while kafir corn has been damaged in some parts of the district by locusts. Cattle in good condition, slaughter stock scarce. Sheep are also doing well whilst butcher stock though fairly plentiful is dear.

Ladismith, May 25.—With a light rainfall and the weather promising, the condition of the veld is very good. Mealies are promising and lucerne excellent. All stock are in good condition and doing well.

Oudtshoorn, May 17.—The veld is very good for the time of year and should the frost hold off we should have an excellent season. Mealies are looking well, but lucerne is not doing so well just now owing to the cool weather. Calving is promising and cattle generally in fair condition, slaughter stock realising good prices. Sheep and goats also in fair condition. Ostriches are doing well with the exception of the young birds, among which tapeworm is prevalent. The citrus crop promises to be good.

Peddie, May 10.—Weather mild, veld good. Mealies and kafir corn good General condition of cattle fair, but the calves are suffering a good deal from yellow liver. Cape goats and ostriches doing well.

Prieska, May 15.—Heavy rains, veld good, weather cold Stock generally fair condition.

Queenstown, May 4.—Rains still continue, weather changeable. Veld good where not cleared by locusts. Cereals now being sown in some parts, in others waiting for the locusts to clear. Very good crops of locusts in some parts, in others the locusts have taken everything. Lucerne is looking well for the winter and there are plenty of stacks about. Stock generally in good condition, but it has been a little too wet for sheep in some parts.

Robertson, May 29.—Beautiful rains have fallen throughout the district, and cereals are being sown. Stock generally is doing well, particularly ostriches. The district is free of disease.

Somerset East, May 10.—Light rains have fallen and the condition of the veld is very good. Stock generally doing well.

Steynsburg, May 14.—Weather changeable, veld good, but locusts have done much damage. Stock generally in excellent condition.

THE TRANSKEI.

Cofimvaba, May 31.—The mealie crop will not yield as well as was expected. Kafir corn looks better, but in many locations the heads of grain are small and unhealthy looking The cause is the abnormal rainfall during the season, and in some cases damage by hail. Some of the low-lying lands became quite boggy and swampy. There should be no actual scarcity of food, and there should be no necessity to import mealies to supplement the local yield. Redwater is still prevalent in the district; there are at present fifteen areas under quarantine, besides three areas quarantined for lungsickness. With the above exceptions, stock generally is in fair condition for this time of the year, and the pasturage is abundant and fairly good. Small swarms of locusts invaded the district during May from a westerly direction, and passed on in an easterly direction.

Flagstaff, May 31.—Average rains, seasonable cold winds during last week of the month. Condition of veld fair, and stock generally doing well. Heavy crops of mealies and Kafir corn are now being reaped.

Matatiele, May 31.—Farmers and natives are busily engaged in reaping what appears to be an average crop of mealies and Kafir corn. Wheat and barley are doing well. Winter has fairly set in, and some heavy frosts have occurred. The pasturage is very good, and stock of all descriptions is doing well

---

Mount Frere, May 31.—The weather has been changeable, and heavy rains fell early in the month. Later it was cold and seasonable. Veld in excellent condition, and stock should do well this winter. Lungsickness still prevalent, but several hundreds of cattle have been inoculated in and near the infected areas, which, it is hoped will stay the further spread of the disease. Crops good in the lower part of the district, but very poor in the upper. In some locations very little will be harvested, nearly all the lands having been destroyed by hail, but there will be no scarcity of grain.

Nqamakwe, May 7.—Past month cold and wet. Sunshine and dry weather are required to ripen the mealie crops. The kafir corn in most of the land in the south-western part of the district has suffered considerably from aphis. Stock in normal condition. Locusts have not appeared in the district.

Tabankulu, May 2.—Crops fast ripening and will soon be harvested. Kafir corn crop will be good, the aphis having disappeared owing to plentiful rains. The mealie crop has suffered partially from grub. Veld in good condition and the prospects point to a good winter. One outbreak of lungsickness has been dealt with, otherwise stock of all kinds in good condition and free from disease.

Willowvale May 31.—Little rain fell during the month. Winter has now set in and some very cold weather has been experienced. All crops have been reaped Lungsickness is very prevalent throughout the district, and cattle have consequently deteriorated in value. The services of a government inoculator have now been obtained, who will inoculate all cattle free of charge. Horses in good condition and no prevalent disease among them. Small stock thriving and free from scab.

NOTES ON THE WEATHER OF APRIL, 1907.

By Charles M. Stewart, B.Sc., Secretary to the Meteorological Commission.

A practically normal mean atmospheric pressure, cool sunless days, and mild nights, with comparatively few frosts, unusually cloudy skies, with practically daily fogs and mists, occasionally of wide range, abundant general rains causing precipitation to be about two-thirds greater than usual, with an exceptionally large number of thunderstorms, were the leading features of the weather of April.

Precipitation.—The rainfall for this month, on the mean of 347 stations, was 3·22 ins. falling on 10 days, being 1·24 in., or 63 per cent. greater than the normal, and 0·54 in. more than during March, and almost double the amount recorded during the previous April. The accompanying table shews that with the exception of the West Coast and the West Central Karoo, the mean divisional rainfall was mostly considerably over two inches (2 ins.), and ranged from 0·97 in. over the West Coast to 5·09 ins. in Basutoland, and reaching 9·39 ins. at Durban (Natal.) Compared with the previous month, the South Coast, the Southern Karoo, the North-East, Basutoland and Rhodesia shew a lower mean precipitation; over the Northern Border it was practically the same, but over the remaining eleven divisions the mean rainfall was considerably in excess of that during March. Similarly a comparison of this month's divisional rainfall with the corresponding averages shews that it was considerably in excess of the normal, with the single exception of the West Coast, where the deficit was only 4 per cent. of the average. The excess was greatest over the more inland areas, where it was mostly double the average, whilst the number of "rain days" was also about twice the usual number, thus showing that the mean intensity was practically the same as usual. On summarising the monthly totals, it is found that no stations

Division.	Mean Rainfall (1907).	Mean No. of days.	Average Rainfall (1891-1900)	Average No. of Days.	Actual Differences from Averages.	Percentage Differences from Averages.
	Inches.		Inches.		Inches.	Per cent.
Cape Peninsula ..	3·06	10	2·94	7	+ 0·12	+ 4
South-West ..	2·30	8	2·18	5	,, 0·12	,, 5
West Coast ..	·97	4	1·01	4	— 0·04	— 4
South Coast ..	2 98	11	2·28	6	+ 0·70	+ 37
Southern Karoo ..	2·12	7	1·23	3	,, 0·89	,, 72
West Central Karoo ..	1·79	6	0·88	3	,, 0·91	,, 103
East Central Karoo ..	2 73	8	1·14	4	,, 1·59	,, 139
Northern Karoo ..	3 15	8	1·48	4	,, 1·67	,, 113
Northern Border ..	3·26	8	1·60	4	,, 1·66	,, 104
South-East ..	4·48	11	2·37	6	,, 2·11	,, 89
North-East ..	2·78	12	1·94	6	,, 0·84	,, 43
Kaffraria	4·56	12	2·08	6	,, 2·48	,, 119
Basutoland ..	5·09	14	2·42	7	,, 2·67	,, 110
Orange River Colony ..	3·77	11	1·95	5	,, 1·82	,, 93
Durban (Natal) ..	9·39	16	2·89	..	,, 6·50	,, 225
Bechuanaland ..	4·43	11	2 00	6	,, 2·43	,, 122
Rhodesia	1·80	9	1·43	4	,, 0·37	,, 26

reported "Nil," a most unusual occurrence, whilst of the 347 stations, only 21 had 0·01—1 in.; 62 had 1·01—2 ins.; 91 had 2·01—3 ins.; 84 had 3·01—4 ins.; 41 had 4·01—5 ins; 27 had 5·01—6 ins.; 13 had 6·01—7 ins.; and 4 had 7·01—8 ins.; of the remaining four (4) exceeding 8 ins, the maximum of 14·53 ins. was recorded at Evelyn Valley; Durban (Natal) coming second with a total of 9·39 ins.; while 8·78 ins. were registered at Wanstead, and 8·67 ins. at Emerald Hill, near Port Elizabeth. On similarly treating the maximum amounts recorded in 24 hours, it is found that, although some of the amounts reported were heavy, there was an entire absence of any sensational records; consequently it may be assumed that the nature of the precipitation was such as was well suited for agricultural operations. Of the 333 stations reporting, no fewer than 208, or 62 per cent. had maxima of 0·01—1 in.; 103 had 1·01—2 ins.; 17 had 2·01—3 ins., leaving only five (5) with more than three inches; these were Emerald Hill with 3·80 ins. on the 1st; Evelyn Valley with 3·75 ins., and Durban (Natal) with 3·70 ins., both on the 7th; Middleton with 3·41 ins. on the 2nd; and Wanstead with 3·05 ins. on the 12th. Although the number of *Thunderstorms* reported shews a continued decrease, they were much more frequent than usual and occasionally covered a fairly wide area. In all 323 instances of this phenomenon were noted on 24 days of the month, viz., 1st to 7th, 9th to 14th, 16th, 17th, 20th, and from the 23rd to the end of the month. They were particularly numerous on the 4th, 27th and 29th. *Hail* was reported from 17 stations on eight days, chiefly the 4th and 27th. No *Snow* or *Sleet* was officially reported, but a newspaper report states that the Brandwacht Mountains in the Western Province were covered with snow for the first time this season on the 10th.

Temperature, Cloud and Wind.—The mean temperature of all the stations was 61·1°, being 1·1° lower than the average and 6·2° colder than during the previous month. This heavy fall in the mean temperature curve was unequally divided between the day and the night temperatures, the former being 6·7° and the latter 5·7° lower than in March. Compared with the averages the days were much cooler and the nights a little milder than usual, the mean maximum (70·6°) being 3·1° lower and the mean minimum (51·6°) being 1° higher than the corresponding normals. The day temperatures were everywhere colder than usual, particularly in the east and in the interior. At the stations in the West, over the Cape Peninsula and along the South and South East Coasts, the mean maxima were between 0·5° and 1·5° lower than the averages, but inland and even at short distances from the coast, the deficit was between four and six degrees, or even more. At the true coast stations the minimum temperatures were mostly about one degree (1°) colder than usual, but the deficits gradually decreased inland becoming converted into excesses of 2° to 2·5° at the plateau stations; but these seem to have been largely influenced by local conditions. Compared with the corresponding month of 1906, the mean maximum was 2·6° lower and the mean minimum 1·9° higher than the values for the previous April. The mean daily range (19°) was 4·1° less than the normal. The mean warmest station was Port St. John's with 66·8° and the mean coldest station Bensonvale with 51·6°, a difference of 15·2°. The highest mean maximum (77·6°) was that for Dunbrody and the lowest mean minimum 37·2° at Bensonvale. The warmest days were mostly those of the 3rd and 22nd although maxima were registered on 1st to 5th, 9th, 10th, 12th, 13th, 15th, 21st to 23rd, and 28th to 30th. The coldest mornings were most commonly those of the 9th, 10th and 20th, but minima were recorded on 7th, 9th to 12th, 18th to 21st, 23rd, 25th and 28th to 30th. The mean of the highest readings was 83·5° as against 90·3° in the preceding month and 86·5° in April, 1906, whereas the mean of the lowest reading was 43·8° compared with 49·8 in March and 41·1° in the corresponding month of last year. The mean monthly range was therefore only 39·5° compared with 40·5° in March and 45·4° in the previous April. The absolute maxima were all considerably lower than 100° F., the highest being 93·0° at East London on the 5th whilst the lowest reading of the thermometer was 32° F. (freezing point) on the 10th at Bensonvale. There was thus an extreme monthly range of only 61° F. *Frosts* mostly slight, were noted at 12 stations on nine days, the only damage reported being the killing of beans at Fort Fordyce on the 11th and 12th.

The mean amount of sky obscured during the month was exceptionally high, being 51 per cent. or 3 per cent. more than during March. *Cloudiness* was fairly uniform, ranging from 24 per cent. at Wellington to 73 per cent. at Port St. John's. At O'okiep it amounted to 34 per cent. but increased to 50 to 60 per cent. over the Cape Peninsula, decreasing eastwards to 47 per cent. at Bird Island, but rising again in the East and South East. Inland it was mostly between 50 and 60 per cent, being, however, only 31 per cent. at Kenhardt, but rising to 69 per cent. at Hopefountain in Rhodesia. *Fogs* or *Mists* were considerably less than during the previous month and were mostly local, although they seem to have been of fairly wide occurrence on the 6th, 16th, 18th and 20th, being most numerously reported between the 16th and the 24th inclusive. In all 95 instances of these were reported on 29 days, the one exceptional date being the 13th.

The prevalent morning *Winds* were Easterly at O'okiep, Southerly to South-Easterly over the South-West, Easterly again at Danger Point, Cape Agulhas and Amalienstein, but Westerly (W. to S.W.) along the South and East coastal districts, but N.E. to S.E. in the interior. At the Royal Observatory (Cape Peninsula) there was an increased proportion of winds from S. to S.E. and N.N.W., but an entire absense of Easterly, North-Easterly and South-South-Westerly winds and a decrease in those from S.W., West and N.W. as well as in the number of calms. The mean *Wind-force* on the Beaufort Scale (0-12) was 1·69, corresponding to a mean hourly velocity of 11·4 miles or 1·5 miles per hour more than in March. These morning winds at the Royal Observatory were only 0·15 of a mile per hour less in velocity than usual. The wind was reported to have attained the force of a *Gale* at five stations on four days; *Dust storms* occurred at two stations on two days and *Hot Winds* at three stations on three days.

In consequence of these heavy, early rains, ploughing operations have been started over the greater part of the country. Locusts have disappeared from certain areas after depositing their eggs, but the most noteworthy feature of the month has been the discovery of the fairly wide-spread occurrence of the fungoid disease, *Plasmopara viticola*, among many of the vineyards in the more central and easterly parts of the country, *e.g.*, Graaff-Reinet, Queenstown, East London, Uitenhage and elsewhere.

OBSERVERS' NOTES.

VRUCHTBAAR.—Ploughing for cereal crops in full swing; ground in beautiful condition. Crops of citrus fruits, oranges, naartjes and lemons promise well, both quality and quantity will be fine.

THEEFONTEIN.—Winged locusts numerous in early part of month, disappeared after depositing their eggs. First frost of season occurred on night of 30th.

THE MEADOWS.—Lovely rains for ploughing, everything looking well. Locusts have disappeared.

WAVERLEY.—Locusts here all the month, destroying everything. No frost up to date.

VAN WYK'S VLEI.—Landowners ploughing. Appearance of country improving.

SUNNYSIDE (Albany).—Winter coming on fast, all trees including apples losing leaves, apricots, peaches and some pears quite bare.

KOKSTAD.—Two light frosts latter part of month. Mealie crops will be very heavy this year. Rivers still keep high at times.

CARNARVON FARM.—This month is a record one since 1900; that is we had for 2·25 in. of rain, 14 rainy days, pretty evenly distributed :—only on three other occasions have we had 8 rainy days. Frosts; 3, all slight, on 8th, 18th and 19th, did no damage whatever. Heavy dews neutralized the effects of frosts. Only 2 gales this month against a six year average of 4½. The principal feature of month has been the incessant cloudy days, all but one. No heat in sun and but little vegetable growth. Nevertheless April has been all that could be desired for sowing. Large lands were sown end of March and beginning of April but in 9 out of 10 cases have been cleared and kept close by locusts. Stock though in good condition are not fat—too much rain. Should cold and above all wet continue through the winter, a lot of stock of all sorts will be struck off the lists.

KOKSTAD.—Mean Barometrical pressure and temperature slightly lower than usual in April. No frost recorded. An unusual amount of rain fell this month—over 4 inches. Stock remains in good condition.

GROOT DRAKENSTEIN.—Mean temperature 1·4° below average. The mean minimum being as much as 3·2° below average. Rainfall 0·31 inches above the mean of 14 years.

DUNBRODY.—Locusts as in preceding month. Good deal of sickness towards latte part of the month—colds, catarrhs etc.

TEMPERATURE, APRIL, 1907.

Stations.	Mean Max.	Mean Min.	Monthly Mean.	Abs. Max.	Date.	Abs. Min.	Date.
Royal Observatory	71·2	55·2	63·2	84·4	3	48·4	21
Simon's Town	71·3	57·9	64·6	85·0	3	52·0	30
Table Mountain (Disa Head)	61·5	48·8	55·2	75·0	15	42·0	10
Wynberg	71·3	53·1	62·2	86·0	3	46·2	28
S. A. College	72·2	55·7	64·0	85·2	2	49·0	21 & 28
Sea Point	70·9	55·5	63·2	83·0	3	50·3	12
Ceres	73·0	52·6	62·8	80·0	1 & 13	48·0	20 & 21
Wellington (Hug. Sem.)	73·9	54·4	64·2	81·2	3	42·9	24
Groot Drakenstein	72·6	53·6	63·1	87·0	15	44·2	28
Danger Point	65·7	55·0	60·3	75·0	3	56·0	28
Elsenburg Ag. College	72·8	50·3	61·6	85·9	3	40·0	10
O'okiep	75·6	51·0	63·3	86·1	12	41·0	24
Cape St. Francis	69·3	57·4	63·4	91·0	22	51·0	28
Dunbrody	77·6	51·9	64·8	94·0	22	42·0	12
George (Plantation)	69·4	53·0	61·2	88·0	22	45·0	11
Cape L'Agulhas	66·6	56·9	61·8	80·0	3	51·0	19
Mossel Bay	69·9	56·3	63·1	89·0	22	49·0	11
Port Elizabeth	70·9	57·9	64·4	87·0	4	53·0	12
Uitenhage	75·2	53·0	64·1	90·1	4	43·5	12
Amalienstein	73·0	49·5	61·2	90·0	22	42·0	10
Murraysburg	69·5	46·5	58·0	80·0	22 & 23	38·0	9 & 10
Hanover	67·9	45·2	56·6	77·0	21 & 22	35·0	11
Hope Town	73·1	51·4	62·3	80·8	12	43·0	11
Kimberley	74·2	53·2	63·7	83·1	12	43·7	11
King William's Town	74·2	53·2	63·7	89·0	22	45·0	11
East London	71·3	58·7	65·0	93·0	5	53·0	25
Bedford	71·2	50·4	60·8	85·0	5	39·0	10
Stutterheim	69·2	51·6	60·4	85·5	22	41·0	10
Sydney's Hope	70·3	53·5	61·9	89·8	22	43·0	10
Evelyn Valley	64·9	48·8	56·8	82·0	22	37·0	7
Aliwal North	70·6	46·8	58·7	80·0	9	40·5	11
Rietfontein (Aliwal North)	66·4	46·0	56·2	74·5	22	38·0	11
Bensonvale Institute	66·0	37·2	51·6	76·0	22	32·0	10
Umtata	72·2	52·1	62·2	85·0	4,22&8	46·0	11 & 19
Port St. John's	73·6	59·9	66·8	82·0	29 & 30	50·0	23
Mount Ayliff	73·4	50·6	62·0	85·5	4	40·0	10
Teyateyaneng	66·5	43·1	54·8	75·0	10	41·0	18 & 28
Mohalie's Hoek	67·7	42·7	55·2	75·0	10	36·0	11
Kokstad	66·5	45·5	56·0	79·0	9	36·6	11
Tabankulu	66·2	47·9	57·0	80·8	4	37·4	11
Kuruman	74·1	51·5	62·8	79·0	10	44·0	20
Hope Fountain	74·4	51·0	64·2	86·2	1	44·5	23
Means	70·6	51·6	61·1	83·5	..	43·8	..
Extremes	..	..	..	93·0	5	32·0	10

RAINFALL, APRIL, 1907.

I. CAPE PENINSULA:

	INCHES
Royal Observatory (*a*) 12 inch gauge	1·94
Cape Town, South African College	2·62
Do. Molteno Reservoir	2·74
Do Platteklip	3·36
Do. Signal Hill	1·54
Sea Point (The Hall)	2·30
Do. (Attridge)	2·16
Camp's Bay	2·56
Table Mountain, Disa Head	3·68
Do. Kasteel Poort	4·10
Do. Waai Kopje	3·93
Do. St. Michael's	5·14
Woodstock (The Hall)	2·07
Do. (Municipal Quarry)	2·63
Do. (Do. Nipher's Shield)	2·91
Newlands (Montebello)	5·07
Kenilworth	3·69
Wynberg (St. Mary's)	4·45
Groot Constantia	3·51
Tokai Plantation	2·57
Plumstead (Culmwood)	3·56
Simon's Town (Wood)	4·17
Do. (Gaol)	3·32
Cape Point	1·91
Robben Island	2·21
Maitland Cemetery	2 79
Tamboer's Kloof	2·62
Woodhead Tunnel	3·55
Lower Reservoir	2·75

SOUTH WEST:

Eerste Rivier	2·37
Klapmuts	2·69
Stellenbosch (Gaol)	3·89
Somerset West	3 62
Paarl	2·66
Wellington (Gaol)	3·17
" Huguenot Seminary	3·62
Groot Drakenstein (Weltevreden)	3 16
Porterville Road	2·94
Tulbagh	1·49
Kluitjes Kraal	3·98
Ceres	1·93
The Oaks	0·93
Rawsonville	1·15
Caledon	3·99
Worcester (Gaol)	0·82
Hex River	1·05
Karnmelks River	1·40
Lady Grey (Div Robertson)	1.14
Robertson (Gaol)	1·54
Montagu	0·63
Danger Point	1·08
Vygebooms River	2·99
Elsenburg Agricultural College	2·38
Roskeen	1·82
Vruchtbaar	3·34

III. WEST COAST:

	INCHES
Anenous	0 24
Klipfontein	0·28
Kraaifontein	0·57
O'okiep	0 41
Springbokfontein	0·25
Concordia (Kraphol)	0·74
Lilyfontein	0·51
Van Rhyn's Dorp	0 99
Clanwilliam (Gaol)	1·15
Dassen Island	1·39
The Towers	1·59
Malmesbury	2·57
Piquetberg	1·95
Zoutpan	1·15
Wupperthal	0·81

IV. SOUTH COAST·

Cape Agulhas	0·89
Bredasdorp	1·00
Swellendam	2·86
Zuurbrak	3·53
Heidelberg	1·71
Riversdale	3·00
Mossel Bay	2 37
Great Brak River	2·27
George	4·70
Do. (Plantation)	4 69
Woodifield (George)	4·60
Concordia	3·72
Knysna	2·67
Plettenberg Bay	1·47
Harkerville	3 81
Blaauwkrantz	3·59
Lottering	3·64
Witte Els Bosch	3 98
Cape St. Francis	2·76
Witteklip (Sunnyside)	0·40
Van Staaden's (Intake)	3·17
Uitenhage (Gaol)	1 62
Do. (Park)	1·64
Do. (Inngs)	1 55
Armadale (Blue Cliff)	2·55
Dunbrody	2·08
Port Elizabeth (Harbour)	3 09
Do. Walmer Heights	8·67
Shark's River (Nursery)	3·69
Do. (Convict Station)	3·73
Centlivres	1·59
Edinburgh (Knysna)	3 31

V. SOUTHERN KAROO.

Ladismith	2·42
Amalienstein	1·74
Calitzdorp	2·00
Oudtshoorn	1·87
Uniondale	1·44
Kleinpoort	3·67
Glenconnor	1·70

VI. WEST CENTRAAL KAROO:

	INCHES
Fraserburg Road	1·14
Prince Albert	1·58
Zwartberg Pass	5·37
Beaufort West (Gaol)	1·98
Nel's Poort	1·36
Camfers Kraal	1·12
Krom River	1·47
Baaken's Rug	1·48
Willowmore	1·08
Rietfontein	0·96
Steytlerville	2·15

VII. EAST CENTRAL KAROO:

Aberdeen (Gaol)	1·90
Corndale	1·36
Klipplaat	3 60
Kendrew (Holmes)	2 32
Graaff Reinet (Gaol)	1·70
Do. (Eng. Yard)	1·73
New Bethesda	2·25
Roodebloem	1·36
Glen Harry	1·04
Wellwood	2·32
Jansenville	3·16
Roode Hoogte	3·46
Toegedacht	1·63
Klipfontein	1·79
Cranemere	2·45
Pearston	4·32
Walsingham	3.76
Middlewater	2·55
Somerset East (Gaol)	5·24
Middleton	7·45
Spitzkop (Graaff-Reinet)	2 71
Bruintjes Hoogte	3·65
Grobelaars Kraal	1·01

VIII. NORTHERN KAROO:

Calvinia	1·55
Middlepost	0·35
Sutherland	0 49
Fraserburg	2 1
Carnarvon	0·63
Brakfontein	1·13
Victoria West	2·56
Britstown	3·90
Wildebeestkooij	2·60
Murraysburg	0 98
De Kruis (Murraysburg)	1·68
Richmond	2 81
Hanover	4·07
Theefontein	2·58
Philipstown	2·23
Petrusville	2·15
The Willows (Middelburg)	3·19
Middelburg (Gaol)	3·97
Do	3·42
Jackalsfontein	5·82
Ezelpoort	5·82
Plaatberg	5·35
Grape Vale	5·75
Ezelfontein	5 77
Roodepoort	5·40

VIII. N. KAROO:—*continued.*

	INCHES
Groenkloof	5·33
Vlakfontein	5·67
Vogelsfontein	4 82
Plaatfontein	5 42
Colesberg	4·17
Tafelberg Hall	3·16
Fish River	1·74
Varkens Kop	3·34
Droogefontein	2·16
Cradock (Gaol)	2·50
Witmoss	2 78
Maraisburg	2·04
Steynsburg (Gaol)	2·50
Tarkastad	2·52
Do. (Dis. Engineer)	2 46
Drummond Park	2·82
Waverley	2·04
Montagu	4·07
Rietfontein (Colesberg)	3·84
Schuilhoek	4·49
Vosburg	2 53
Zwavelfontein	2 05
Holle Rivier (Colesberg)	5·36
The Meadows (Schoombie)	2·69
Cradock (Station)	2 44
Wolve Vlei (Middelburg)	1·28

IX. NORTHERN BORDER:

The Halt	4·20
Kenhardt	0·94
Trooilapspan	2·19
Van Wijk's Vlei	2·58
Prieska	4 09
New Year's Kraal	2 85
Dunmurry	6·18
Karree Kloof	2·73
Griquatown	3·34
Douglas	3·70
Hopetown	2·19
Orange River	1·83
Newlands (Barkly West)	3 01
Barkly West	3 12
Bellsbank	2·06
Kimberley (Gaol)	4·37
Do. Stephens	4·89

X. SOUTH-EAST:

Melrose (Div. Bedford)	2·77
Dagga Boer	3·30
Fairholt	3 43
Lynedoch	2 61
Cheviot Fells	2 35
Bedford (Gaol)	4·67
Do. (Hall)	4·42
Sydney's Hope	3·76
Adelaide	3·13
Atherstone	3 12
Alexandria	2·92
Salem	4·36
Grahamstown (Tronk)	4·85
Heatherton Towers	2·02
Sunnyside	4·18
Fort Beaufort	3 16
Katberg	4 70

X. SOUTH-EAST—*continued*

	INCHES
Seymour	2·95
Glencairn	5 10
Port Alfred	3 54
Hogsback	7 58
Peddie	4·73
Keiskamma Hoek	4·24
Cathcart (Gaol)	2·19
Cathcart (Forman)	1·90
Thaba N'doda	7·78
Evelyn Va'ley	14·53
Thomas River	1 87
Perie Forest	6·52
Isidenge	6 47
Kologha	4·25
King William's Town (Gaol)	3·11
Do. (Dr. Egan)	3·94
Stutterheim (Besté)	3·65
Fort Cunynghame	3·98
Kubusie	3·95
Quacu	4·26
Blaney	3·72
Kei Road	4·74
Bolo	3·66
Fort Jackson	6·02
Prospect Farm (Komgha)	6·02
Komgha (Gaol)	6 89
Chiselhurst	6 64
East London West	5·60
Cata	5·85
Wolf Ridge	6·76
Dontsah	6 52
Mount Coke	5 60
Blackwoods	3·70
Albert Vale (near Bedford)	2·86
Heatherton Towers (Irrigation)	·04
Huxley Farm (Stutterheim)	·04

XI. NORTH-EAST:

Venterstad	2·58
Burghersdorp (Gaol)	3·53
Molteno	2·83
Lyndene	2·72
Thibet Park	2 92
Sterkstroom (Station)	3·05
Do.. (Gaol)	2·71
Rocklands	2·02
Aliwal North (Gaol)	2·62
Do (Brown)	3·03
Do. (Dis. Engineer)	2·86
Carnarvon Farm	2·15
Halseton	2·93
Jamestown	3·00
Whittlesea	1·66
Queenstown (Gaol)	1·71
Rietfontein (Aliwal North)	3·85
Dordrecht	2·06
Herschel	5 06
Lady Grey	3 16
Lauriston	3·89
Lady Frere	1·74
Contest (near Bolotwa)	2·28
Sterkspruit	4·00
Keilands	3.01
Barkly East	2·05
Blikana	3·69

XI. NORTH-EAST:—*continued.*

	INCHES
Albert Junction	3·95
Queenstown (District Engineer's Office)	2·14
Hughenden	1·48
Glenwallace	1·70
Indwe (District Engineer's Office)	2 29
Bensonvale Inst. (Herschel)	5·05
Cathcart (Queenstown)	2·33
Rhodes	3·16
Dordrecht (D.E's. Office	2·07
Stormberg Junction (D/E)	1·62
Broughton (Molteno	2·74

XII. KAFFRARIA:

Ida (Xalanga)	3·47
Slaate (Xalanga)	4·50
Cofimvaba	3·08
Tsomo	3·28
N'qamakwe	3·50
Engcobo	4·43
Butterworth	3·77
Woodcliff	4·89
Kentani	5·24
Maclear	6 32
Idutywa	3·26
Bazeya	4·85
Willowvale	5·18
Mount Fletcher	4·87
Somerville (Tsolo)	2·84
Elliotdale	3 75
Umtata	3·45
Cwebe	5·46
Tabankulu	4·42
Mount Ayliff	3·62
Kokstad	3·16
Do. (The Willows)	4·10
Seteba	4·96
Flagstaff	4·69
Insikeni	7 22
Port St. John's	5·57
Umzimkulu	3·86
Wanstead	8 78
Maclear (Station)	6·04

XIII. BASUTOLAND:

Mafeteng	4·
Mohalies Hoek	5·29
Maseru	4 37
Teyateyaneng (Berea)	5 17
Qacha's Nek	6·20
Leribe	4·99

XV. NATAL:

Durban (Observatory)	9 39

XVII. BECHUANALAND:

Taungs	2·72
Vryburg	3·64
Mafeking	7 74
Setlagoli	5·33
Kuruman	2·70

XVIII. RHODESIA:

Hopefountain	1 24
Rhodes Matoppo Park	2·88
Inyanga	1 29

CURRENT MARKET RATES OF AGRICULTURAL PRODUCE.

The following Table of Current Market Rates (Wholesale) of Agricultural Produce on Saturday, the 25th May, 1907, ruling at the several centres named, is published for general information:—

CENTRE.	A. Wheat per 100 lb.	B. Wheat Flour per 100 lb.	C. Boer Meal per 100 lb.	D. Mealies per 100 lb.	E. Mealie Meal per 100 lbs.	F. Barley per 100 lb.	G. Oats per 100 lb.	H. Oat-hay per 100 lb.	J Potatoes per 100 lb.	K Tobacco (Boer Roll) per lb.	L. Beef per lb	M. Mutton per lb.	N. Fresh Butter per lb.	O. Eggs per doz.	P. Cattle (Slaughter)	Q. Sheep (Slaughter)
	£ s d	£ s d	£ s d	£ s d	£ s d	s d	s d	£ s. d	£ s. d.	£ s d.	s. d	s d	£ s. d			
Aliwal North	0 8 0	0 17 6	0 12 6	0 7 9	0 4 6	6 0	6 0	0 6 0	0 4 0	1/6 to 2 -	0 8	0 7	0 0 10	2 6	£7 to £9	14/- to 19,-
Beaufort West	0 10 0	0 15 6	0 12 0	0 9 0	0 11 6	9 0	9 0	0 5 9	0 8 0	0 0 10	*6d to 1/-	*6d to 7d	0 1 6	2 0	£15	22,-
Burghersdorp		...	...	0 5 0	...	...	.	0 6 0	0 3 6	...	*0 8½	*0 5	0 1 0	2 0	...	...
Cape Town	...	...	...	...	...	7 6	7 0	0 5 0	0 8 1	...	...	...	0 1 4	2 0	...	...
Clanwilliam	0 11 0	...	12/- to 13/-	0 7 0	...	6 6	7 0	...	0 6 0	0 1 0	7d. to 8d	6d to 8d	1/6 to 2/	1 3	...	...
Colesberg	...	...	..	0 11 4	...	...	...		0 7 6	...	...	...	9d to 1/-	2/- to 2 5	...	...
Cradock	0 7 0		1 0 0	0 6 3	0 6 3	4 6		0 5 6	0 4 6	0 0 6	...	0 6	0 1 6	2 9	£11	17/-
Dordrecht	0 7 0	0 13 0	11 0	0 4 0	0 7 0	4 0	5 0	0 2 0	0 4 0	0 1 0	0 6½	0 5½	0 1 9	1 6	£10	18 -
East London	0 9 8	0 12 0	0 11 3	0 5 9	0 8 9	5 6	8 9	0 4 0	0 6 6	0 1 6	*0 7	*8d & †7d	0 1 6	2 3		36/-
Graaff-Reinet	0 6 0	...	...	4 9	...	3 9	6 6	0 4 9	0 7 6	0 0 6	0 7	0 7	0 1 7½	2 1½	...	...
Graham's Town	0 6 0	...	..	4 9	.	3 9	6 6	0 4 9	0 7 6	0 0 6	0 7	0 7	0 1 7½	2 1½	...	...
Kimberley	0 10 0	0 14 6	0 12 6	0 8 0	0 7 0	7 6	8 0	0 6 6	0 14 6	0 0 7½	0 0	0 8	..	2 1	£8 10s. to £11	16/- to 18 -
King Wm's Town	0 5 6	0 14 6	0 12 0	0 5 0	0 6 6	5 0	5 0	0 3 6	0 6 6	0 0 8	0 6½	0 6½	0 1 6	1 9	£14 10s.	22 3
Malmesbury	8 8	0 15 0	0 11 6	0 8 6	0 9 0	7 0	7 0	0 4 6	0 9 0	0 1 0	0 6	0 6	0 1 3	1 6	£13	22 -
Mossel Bay	0 10 0	0 13 0	0 12 0	0 12 0	...	5 0	5 0	0 5 0	0 17 0	0 1 0	0 8	0 9	0 2 0	1 6	...	...
Port Alfred	0 8 6	0 16 0	0 14 0	0 8 0	0 13 0	5 0	6 0	0 3 0	0 7 6	0 0 6	0 8	0 8	0 1 3	1 6	...	...
Port Elizabeth	0 7 0	...	...	0 6 0		4 6	6 6	0 4 3	0 10 6	...	0 7	0 7	0 1 3	2 6	...	...
Queen's Town	0 5 3	0 9 3	0 4 9	0 4 6	0 4 0	4 6	5 0	0 4 6	0 4 0	0 1 0	* 6	*0 6½	0 1 6	2 3	£12 to £15	20,- to 28 -
Tarkastad	0 12 0	0 13 6	0 12 6	0 7 6	9 6	5 6	10 0	0 6 0	0 5 0	0 1 0	*0 6	*0 6	0 0 9	1 6	£10	20/-
Vryburg	0 12 0	0 12 6	0 14 0	0 7 6	0 9 0	10 0	11 0	0 8 0	0 8 0	...	...	...	0 1 3	...	..	...
Worcester	0 9 0	0 14 0	0 10 0	0 7 6	0 8 6	8 0	7 9	0 4 9	0 6 6	0 0 6	*6d to 9d †5½d to 8d	*6d to †7d †5½d to 6½d	0 1 6	2 0	£9 to £12 Cs.	22,6 to 25/-

NOTE.—A blank space denotes "no transactions. *Colonial †Frozen (Imported).

DEPARTMENTAL PUBLICATIONS.

The following pamphlets, reprints, &c. are obtainable on application to the Editor of the *Agricultural Journal*, Department of Agriculture, Cape Town. Members of Farmers' and Fruit Growers' Associations applying for same through the Secretaries of these Associations are supplied free of charge.

Agricultural Miscellanea, price 6d. each. Extracts from Vols. I. to V. of *Agricultural Journal.*

Artificial Grasses and Fodder for Stock; Ensilage; Treatment of Cereal and other Crops; Viticulture and Wine Making; Forestry; Locusts and their Destruction; Possible New Industries for Cape Farmers; Dairying; Fruit Culture (6d.)

Agriculture.

Wheat Production in Australia (1s. 6d.) by A. C. Macdonald; *Wheat Production in Australia (1s. 6d.) by W. Halse and J. D. J. Visser; Hop Cultivation (3d.) translated by A. W. Heywood; *Brak Land in Relation to Irrigation and Drainage (1d.); The Velvet Bean (1d.); Potato Disease (1d.); Scheme of Manurial Experiments (1d.); Leguminous Forage Crops for Trial in Cape Colony (1d.); Sundry Forage Crops for trial in Cape Colony (1d.); Poultry in South Africa: Rearing Management and Improvement, with notes on Prevalent Diseases and Internal and External Parasites (3d.); The Salt Bushes (1d.); Tobacco Culture by P. Bornemisza (1d.); The Cultivation of Tobacco in the Colony by K. Schenck (3d.); Tobacco Wilt in Kat River Valley (1d.); *The Process and Appliances for the Flue Curing of Tobacco. (3d.)

Dairying.

Dairy Breeds by A. C. Macdonald (9d.); *Dairy Industry in Great Britain by A. C. Macdonald (6d.); *Dairy Industry in Denmark (2d.); Ready Reckoner for Cream Testing (1s.); †Dairy and its products by D. Hutcheon (2d.); *Cheddar Cheese Making (1d.)

Entomology.

The Bont Tick (1d.); Bean Bruchus 1d.; Cabbage Aphis (1d.); Codling Moth in Madeira Fruit (1d.); *Codling Moth (1d.); Fruit Fly (1d.); Fumigation Supplies (1d.); Insect Friends and Foes (1d.); Methods of Locust Destruction (1d.); *Peach Yellows (1d.); Pear Slug, Paris Green (1d.); Remedy for Mestwurmen (1d.) *Spray Calendar (1d.); *Spray Pump Notes (1d.); Scale Insects on Ornamental Trees and Plants (1d.); Two Pine Apple Pests (1d.); Tree Fumigation in California (1d.); Winter Spraying (1d.); Wattle Bag Worm (1d.); Bordeaux Mixture (1d.); Deaths Head Moth Superstition (1d.); Fumigation under Box Covers (1d.); The House Fly (1d.); New Oak Tree Pest (1d.): Nursery Inspection and Quarantine Bill (1d.); Potato Tuber Moth (1d.); The Codling Moth; Notes on its Life Cycle and Remedies (1d.); Gall Worms in the Roots of Plants (1d); The Fruit Fly,* (with coloured plates) (3d.); Another Introduced Scale Pest (1d.); Washes for Red Scale (1d.); Fruit Fly: Peach Fly (1d.); Lime - Sulphur - Salt Wash for Scale Insect (1d.); The Fruit Moth (1d.); Fusicladium of the Apple and Pear (1d.); Mealie Stalk Borer (3d.)—*coloured plate*: Cleaning up Nursery (1d.); Natural Enemies of the Fruit Fly: Report on Investigations in Brazil (1d.); Locust Birds and Locust Poison (1d.); The Brazil Fruit Fly Parasites (1d.); Cyanide Gas Remedy for Scale Insects (3d.); Arsenate of Lead (1d.); The Antestia Fruit Bug (1d.); Caterpillars Destroying Trees (1d.)

Forestry.

British National Forestry (1d); Botanical Observations on Forests in Eastern Pondoland (1d.); †Elementary Principles of Sylviculture or Woodcraft (1d). National Forests (1d.); Indigenous Timbers of the Cape (1d.); Misuse of Coal and the Uses of Forests (1d); Tree Planting for Timber and Fuel (1d.); Tree Planting for Farmers (1d.)

NOTE.—All those marked with * are obtainable in Dutch and English.
† Dutch only.

Fisheries.

Trout and Carp Breeding and Stocking of Streams (1d.); *Methods of Preserving Fish by Smoking (1d.); Portable Floating Hatching Box for Trout Ova (1d.) The Protection of Trout (1d.); The Ocean and its Resources (1d.)

Horticulture

Fruit Culture in the Gamtoos River Valley (1d.); *Marketing of Fruit (1d); The Olive at the Cape (2d); Tomatoes and Fruit for Export (1d.); Citrus Culture in Cape Colony: Report of the Citrus Commission (1d.); *Fruit from Orchard to Buyer (1d); Netting for Fruit Trees (1d.); Fruit Culture in Argentina (1d.); Vegetables for Exhibition (1d.); Chrysanthemum Rust (1d.)

Veterinary and Animal Industry,

*Anthrax, Charbon, Mitzbrand or Miltziekte (1d.); *Heartwater (1d.); *Malarial Catarrhal Fever of Sheep (1d.); Rinderpest: Dr. Koch's Report (1d.); *Inoculation against Rinderpest (1d.); Dr. Kohlstocks Report on Inoculation for Rinderpest (1d.);*Redwater, Texas Fever or Tick Disease (1d.); *Redwater, Anthrax and Quarter Evil (1d.); *Sheep and Wool (1d.); The Eye and its Diseases (1d.): Husk, Hoose or Parasitic Disease of the Lungs of Cattle, Sheep and Pigs (1d.); Tick Heartwater Experiments (1d.); Indigestion and Diarrhœa in Calves (1d.); Persian Sheep and Heartwater (1d); Poisoning of Stock (1d.); Retention of the Fœtal Membrane, or Afterbirth in Cows (1d); Stijfziekte, Lamziekte or Osteo-Malacia and Paralysis (1d.); Tuberculosis and the Use of Tuberculin (1d.); African Coast Fever with Description of Dipping Tank (3d.); *Rinderpest in South Africa (3d) by D. Hutcheon; *Fluke or Slak in Liver of Sheep (3d.)—*coloured plate*; *Anthrax or Miltziekte and Quarter Evil or Sponsziekte (1d.); Osteo Porosis (3d.)—*coloured plates*; *Glanders (3d)—*coloured plate*; *Animal Castration (1d.); *Preventive Inoculation for Redwater (1d.); *Abortion in Cattle (1d.); Treatment for Worms in Domestic Animals (1d.); *Lungsickness of Cattle, Contagious Pleuro-Pneumonia, or Pleuro-Pneumonia-Bovum-Contagiosa (1d.); *Swine Fever, Hog Cholera or Pig Typhoid (3d.)—*coloured plates*; Castration of Females and Animals other than the Horse (1d.); Poisoning of Horses by *Ornithogalum Thyrsoides* or Chinkerinchee (*coloured plate*) (3d.); Horse Sickness by D. Hutcheon (2d); Ticks and African Coast Fever (1d.); Cirrhosis of the Liver in Stock (1d.); Liver Disease among Calves (3d); The Arsenite of Soda Dipping Mixture (1d.); *Lampas; Preventive Vaccination against Anthrax.

Viticulture.

†Reports on Viticulture (3d.); *Reconstitution Phylloxerised Vineyards (1s.); Report on Failure of Hanepoot Grapes on American Vines (1d); The Making of Wine and its By-Products (6d.); How to Treat Wine Casks (1d.); Failure of Vines (1d.); Manufacture of Dry Wines in Hot Countries (3d.); Anthracnose in Constantia (1d.)

Miscellaneous.

Game Seasons (3d.); Land Laws of Cape Colony (1d.); †Monsonia: the Cape Cure for Dysentery (1d.); *Rainfall of South Africa (1d.); Sand Dunes of Gascony (5d.); The Metric System (1d.); South African Stud Book, Constitution, Rules, &c. (1d.); Bars in Ostrich Feathers (1d.); *Information regarding the Mining Laws. (1/-); The Preservation of Game in Cape Colony.

NOTE.—All those marked with are obtainable in Dutch and English.
† Dutch only.

THE PRODUCE MARKET.

CAPE TOWN.

Mr. R. Muller, of Strand Street, Cape Town, reports for the month ending May 31st:—

Ostrich Feathers.—A good amount of business has been done. Consignments coming forward are finding buyers readily. The tendency is, however, for lower prices, and up-country buyers will do well to bear this in mind.

	£	s.	d.	£	s.	d.
Super Firsts	17	10	0	35	0	0
Firsts, Ordinary to Super	11	0	0	14	10	0
Seconds	8	0	0	9	10	0
Thirds	6	0	0	7	10	0
Femina, Super	12	0	0	16	0	0
Femina, Seconds to Firsts	5	10	0	10	10	0
Byocks (fancy).. ..	5	10	0	9	10	0
Long Blacks..	3	10	0	7	10	0
Medium Blacks.. ..	2	0	0	3	0	0
Short to Medium ..	0	10	0	2	10	0

	£	s.	d.	£	s.	d.
Floss	0	5	0	1	10	0
Long Drabs..	2	10	0	4	0	0
Medium Drabs	1	5	0	2	0	0
Short to Medium ..	0	10	0	1	15	0
Floss	0	2	6	1	10	0
White Tails..	1	15	0	3	15	0
Coloured Tails	0	10	0	2	10	0
Chicks	0	1	0	0	2	0
Spadonas..	2	10	0	5	0	0
Inferior Black and Drabs, short to long..	0	0	6	1	10	0

Wool.—The London sales closed on the 16th of May with active competition. Prices for heavy and inferior Grease were from a farthing to a halfpenny cheaper, as compared with prices of the previous auctions, while all super qualities were firm at unchanged rates. Most of the wools now offered locally consist of short and wasty lots, which remain difficult of sale. A few parcels of Snow-Whites have changed hands; prices realised up to 1s. 8½d. per lb.

	s.	d.	s.	d.
Super long Grass Veld	0	8	0	10
Do. Karoo	0	6¾	0	8
Medium..	0	5	0	6
Short and Inferior ..	0	4	0	4½
Wool for washing	0	4½	0	6

	s.	d.	s.	d
Snow-white, Super to Extra	1	7	1	10
Do. Ordinary	1	1	1	6
Fleece, washed	0	0	0	10

Mohair.—The market remains unchanged. Super Summer Firsts have realised from 13½d. to 14d. The latter price must be taken as full market value for super quality lustrous hair. Ordinary Firsts may be quoted from 12d. to 13d. per lb.

	s.	d.	s.	d.
Firsts, Summer	1	1½	1	2
Kids	1	4	1	8
Seconds	0	6½	0	10

	s.	d.	s.	d.
Winter	0	10½	0	11½
Do. Kids	1	1	1	2½

Hides and Skins.—At the London sheep skin sales, held on the 10th of May, there was little change, except in Cape skins, which were lower. Hides were firm at old rates.

R. MÜLLER, 77, STRAND STREET, CAPE TOWN,

Pays HIGHEST prices for —

WOOL, OSTRICH FEATHERS,
MOHAIR, SKINS, HIDES,
and other PRODUCE.

R. MÜLLER, Cape Town,

Supplies **Best MERINO RAMS** and **EWES.**

Bankers: African Banking Corporation.

P.O. Box No. 133 Telegrams: RELLUM, Cape Town. Telephone No 180.

R. MÜLLER,

77, Strand Street, CAPE TOWN.

BENNIE & COMPANY,

Produce Merchants,

Forwarding and Commission Agents,

Market Street, Kimberley

CONSIGNMENTS of Produce, Fruit and Live Stock received and sold on the Market, or out of hand, to best advantage, followed by prompt remittance.

FORWARDING to any part of the Country carried out, with all expedition.

PRODUCE of all Kinds bought for Cash, Large Stocks held in our Stores.

BONE MEAL. – We have been appointed *Government Agents for Kimberley District.* Large or small quantities can be supplied to Farmers at cost price.

CORRESPONDENCE INVITED.

Telegrams: BENNIE—KIMBERLEY *P.O. Box 39.*

PORT ELIZABETH.

Messrs. J. Daverin and Co., report under date May 31 :—

Ostrich Feathers.—The Market was heavily supplied this week, the sale occupying 3½ days, when the usual average assortment was offered. Competition on the first three days was fairly active, prices shewing little or no change: but to-day the market ruled very strong, and our large sales resulted very satisfactorily to owners. The London sales open on Monday next, when about £170,000 value will be offered. It is generally expected that Whites and Feminas will show some weakness, but that Blaks and Drabs will bring fair prices. There has been very little business done out of hand. The total amount of Feathers sold on the Municipal Sales this week amounted to £14,428 14s. 1d., and weighed 4,805 lbs. 13¾ ozs.

	£	s.	d.	£	s.	d.
Primes : Extra super				Special Prices.		
Good to super	15	0	0	20	0	0
Whites : Firsts	11	0	0	15	0	0
Seconds ..	7	0	0	10	0	0
Thirds ..	2	10	0	6	10	0
Feminas :						
Super ..	11	0	0	16	0	0
Firsts ..	8	0	0	10	0	0
Seconds ..	4	10	0	7	0	0
Thirds ..	2	0	0	3	10	0
Greys ..	4	10	0	8	0	0
Fancy ..	5	10	0	9	0	0
Tails : White ..	1	10	0	3	15	0
Light ..	1	5	0	3	0	0
Coloured & Dark	0	5	0	1	2	6

	£	s.	d.	£	s.	d.
Blacks : Long..	3	10	0	5	10	0
Medium ..	1	5	0	2	10	0
Short ..	0	10	0	1	0	0
Wirey .	0	1	0	0	1	0
Floss ..	0	6	0	1	5	0
Drabs : Long ..	1	10	0	4	0	0
Medium ..	0	12	6	1	0	0
Short ..	0	2	6	0	6	0
Wirey ..	0	0	6	0	1	0
Floss ..	0	6	0	1	5	0
Spadonas :						
Light ..	1	15	0	5	0	0
Dark ..	0	10	0	2	10	0
Chicks ..	0	0	3	0	2	6

Wool.—There is nothing fresh to report in this market, which remains steady, and a fair amount of business has been done in the open market during the week, our sales 1,100 bales being the most important. On the public market yesterday a large quantity was offered; competition was active and full prices paid for all well-conditioned parcels. Heavy waste lots were neglected.

Snowwhite Extra Superior ..	20d	21½d
Snowwhite Superior ..	18d	20d
Do Good to Superior	16½d	17¼d
Do Inferior Faulty	16d	16½d
Grease, Super Long, well-conditioned, Grassveld grown (special clips)	9½d	10d
Grease, Super Long, well-conditioned, Grassveld grown ..	8d	9d
Grease, Super Long, well-conditioned, Karoo grown (special clips)	7½d	8d
Grease, Super Long, Karoo grown ..	6½d	7d
Grease, Super Long, Mixed Veld ..	5¾d	7d
Grease, Light, faultless, medium, Grassveld grown.. ..	6½d	7¾d
Grease, Light, faultless, medium Karoo grown	6d	6¼d
Grease, Light, faultless, short Karoo grown	5½d	5¾d
Grease, Short, faulty and wasty ..	6¼d	7d
Grease, Coarse and Coloured ..	4¼d	4½d
Scoured, Coarse and Coloured ..	6½d	12d
Basuto Grease, short..	6½d	7d
O. R. C. Grassveld Grease, long and well-conditioned (special clips) ..	7½d	8d
O. R. C. Grassveld Grease, long and well-conditioned ..	6½d	7¼d
O.R.C. medium grown, light, with little fault	6d	6½d
O.R.C. short, faulty and wasty ..	5d	5¼d
O.R.C. Karoo grown, long and well-conditioned ..	6¼d	6¾d
O.R.C. medium grown, light, with little fault	5d	6d
O.R.C. short, faulty and wasty ..	4½d	5d

Mohair.—This market remains steady, and a fair amount of business has been done on the open market. On the public market on Tuesday a large quantity was offered to good competition, The bulk of the offerings found buyers at satisfactory prices.

Super Kids ..	1s	5½d	1s	5½d
Ordinary Kids ..	1s	4d	1s	5d
Superior Firsts, special clips	1s	2d	1s	2½d
Ordinary Firsts ..	1s	1½d	1s	2d
Short Firsts ..	1s	0½d	1s	1d
Superfine Long Blue, O.R.C. Hair nominal	1s	2d	1s	2½d
Mixed O.R.C. Hair (average) ..	0s	11d	0s	11½d
Do. Very Mixed ..	0s	10d	0s	10½d
Seconds and Grey ..	0s	8d	0s	9d
Thirds	0s	6d	0s	6d
Winter Kids (special clips) ..			1s	2½d
Winter Kids (good ordinary) ..	1s	1d	1s	2d
Winter Hair ..	0s	11d	0s	11½d

Skins.—Sheepskins sold this week in bundles, at 7d. per lb.; Pelts at 6d.; Capes, 1/11 each, damaged 6d. each; Goat, 13d.; damaged, 6¼d. per lb.; Angoras, 9¾d. per lb.; Shorn, 7d.; damaged, 4½d. per lb.

Hides.—Sundried sold at 9d., damaged, 6d. per lb.; Drysalted, 7¾d.; damaged, 5¼d. per lb.; Madagascar hides, 7d., damaged, 5½d. per lb.; Thirds, 3½d.

THE GRAHAMSTOWN

BOTANIC GARDENS.

ORANGE and NAARTJE TREES,

Grafted on Lemon from 2/- each.

FRUIT TREES,

Grafted on suitable stocks from 1/- each.

50 Trees and upwards NOT IN TINS, free by Rail in the Colony

Catalogues including ROSES, &c., free on application.

D. E. TIDMARSH.

BREEDERS' DIRECTORY

AND GENERAL FARM NOTICES.

Notices under this heading are inserted at the rate of one penny per word per issue; minimum charge 2s. 6d. Payment must accompany order. Six consecutive insertions 10% discount; twelve 15% discount. Cheques and P.O.O. to be made payable to the Accounting Officer, Department of Agriculture, Cape Town.

CATTLE.

JERSEYS.

Thoroughbred Herd. Celebrated Island bred bull "Clove," and several of the best cows and heifers from Mr. H. W. Struben's late herd.—Mrs. A. A. Dunn, De Tuin, Piquetberg.

Thoroughbred pedigree bulls for sale, from Imported or Colonial bred prize stock, good milking strain For particulars, apply to SUPERINTENDENT, Porter Reformatory, Tokai, P.O. Retreat.

FRIESLANDS.

Pure Frieslands. Enquire for cows, young bulls, and heifers. Oldest pure herd in Eastern Province. Grand milkers. Prize stock. Also, Colonial Rambouillet Flock Rams, limited number.—F. F. WIENAND, Bellevue, Bedford, C.C.

R. Cross, HILLSIDE, P.O. BOLOTWA. Has high-class Friesland bulls for sale. Herd may be seen by appointment. Bulls from Imported and Colonial Cows.

SHEEP.

MERINOES.

PRINGLE BROS. — **Rambouillet Merino Rams.** Sold only at the Bedford Ram Breeders' Fairs at dates published. PRINGLE BROS., Glen Thorn, P.O. Linton, Adelaide.

R. Pell Edmonds, RIPPLEMEAD, DOHNE, Breeder of Pure-bred Pedigree Merino Sheep and Pedigree Black Welsh Cattle. —For particulars, see page xxxviii.

HORSES.

For Sale.—Imported Cleveland Stallion: sire, Pitch & Toss, 3 years champion in succession; foaled 1897. Royal Horse Show Prize Winner. Quiet to ride and drive; tried at stud. A bargain. W. J. Walsh, Klein River Estate. P.O. Stanford, Caledon, C.C.

PIGS.

Berkshire pigs, thorough bred, pedigree, boars and sows, from Imported stock, winners of numerous prizes. For particulars, apply to, SUPERINTENDENT, Porter Reformatory, Tokai, P.O. Retreat.

For Sale.—A few young boars from Imported Ohio Polond China stock. Farrowed July 1906 and March 1907. For price and particulars, apply J. T. HINDE, Far, Goedgevonden, Ceres Road.

OSTRICHES.

Specials only.—Chicks, £5 to £20 each; Young Birds, £10 to £30.—F. W. BAKER, Laughing Waters, Willowmore.

GENERAL.

H. Vermaak, The Pines, Maraisburg, Cape Colony, has on hand and for sale at very reasonable prices, PURE-BRED FRIESLAND BULLS and PURE-BRED MERINO RAMS of the RAMBOUILLET breed.

THOROUGHBRED PERSIAN RAMS and OSTRICHES.—Hougham Abrahamson Long Hope Siding, C.C. Breeder of Rams from progeny of ewes passed into Stud Book. of Cape Breeders' Association. Also selected Breeding Ostriches.

PASPALUM GRASS PLANTS.—Quotations for plants, in bags free on rail Stellenbosch (keep moist long distance). See *Agricultural Journal*, May, 1906, page 622, or from A. C. BULLER, Dwarsriviershoek, Stellenbosch.

PURE BRED ANGORA GOAT RAMS.

Bred from the Choicest Strains, and Prize-winners at the leading Agricultural Shows of Cape Colony. For particulars apply to A. B. HOBSON, Martyrsford, Jansenville.

PERSIAN SHEEP AND OSTRICHES.

S. Montague Gadd, SPRINGFIELD, TAFELBERG. Orders booked for young rams, from Stud-book Ewes and for Ostrich Chicks from the best strains in the country.

THE POULTRY YARD.

PRIZE and UTILITY POULTRY of the BEST ENGLISH and AMERICAN STRAINS.—SOUTH AFRICAN BRED. —Hardy, Healthy, Vigorous, Egg Production a Speciality. WHITE LEGHORNS—BROWN LEGHORNS —BUFF LEGHORNS — WHITE WYANDOTTES — SILVER PENCILLED WYANDOTTES—BARRED PLYMOUTH ROCKS. Stock & Eggs for Sale in Season.—Correspondence invited.—S. Smith, Talana, Wellington Avenue, Wynberg.

BUFF ORPINGTONS.

THE FARMER'S FOWL. The fowl that LAYS WHEN EGGS ARE TOP PRICE and are also A 1 table birds. My Buffs have unlimited orchard and grass run, and are noted for hardiness and good laying qualities Young stock always for sale at very reasonable prices. Ask for inclusive quotations; carriage paid to any station in South Africa and AT MY RISK to rail destination. My list of prizes won at shows all over South Africa will convince you that this unrivalled *Colonial* strain of 9 years' standing CAN HOLD ITS OWN AGAINST IMPORTED STOCK. Buy hardy Colonial-bred birds and save your pocket. Eggs from pure-bred utility strain, 12/6. Address: A. C. Buller, Dwarsriviershoek, Stellenbosch.

WHITE LEGHORNS.

Best American Utility Strains. Settings of Eggs for sale, from pure-bred utility White Leghorns, F.O R., 10/6 per setting of 15. Terms, cash with order. Mrs. W. L. Steel, Croydon House, Faure, C.C.

TURKEYS.

MAMMOTH AMERICAN BRONZE.—HARDY STRAIN OF GREAT SIZE. Noted prize winners. Young stock for sale after April. Orders booked now. Ask for inclusive quotations. Carriage paid to any station in South Africa and AT MY RISK to rail destination. Eggs in season. Full particulars from A. C. Buller, Dwarsriviershoek, Stellenbosch.